Vol. XXVI DECEMBER, 1942 No. 6

THE JOURNAL OF APPLIED PSYCHOLOGY

Edited by
JAMES P. PORTER, Ohio University
Athens, Ohio

TABLE OF CONTENTS

CHARLES H. GOODMAN. A Comparison of the Interests and Personality Traits of Engineers and Liberal Arts Students 721

MARGARET MERCER. A Study of Interest Patterns of Successful and Unsuccessful Home Economics Students Entering College with Similar Achievement and Aptitude 738

LORENE TEEGARDEN. Manipulative Performance of Young Adult Applicants at a Public Employment Office—Part II 754

C. H. LAWSHE, JR. The Purdue Industrial Training Classification Test 770

ALBERT SIDNEY BECKHAM. A Study of Social Background and Art Aptitude of Superior Negro Children 777

DAVID W. COOK AND MARGUERITE F. BARRE. The Effect of Specialized Industrial Norms on the Use of the Minnesota Rate of Manipulation Test as a Selective Instrument in Employment Procedure 785

EDWIN E. GHISELLI. The Use of the Strong Vocational Interest Blank and the Pressey Senior Classification Test in the Selection of Casualty Insurance Agents ... 793

L. P. GUEST. The Genesis of Brand Awareness ... 800

BERT HANMAN. The Performance of Adult Males on the Minnesota Paper Form Board Test and the O'Rourke Mechanical Aptitude Test ... 809

ARTHUR W. AYERS. A Comparison of Certain Visual Factors with the Efficiency of Textile Inspectors ... 812

ABRAHAM SPERLING. A Comparison between Jews and Non-Jews with Respect to Several Traits of Personality ... 828

LOWELL L. GIFFEN. An Improved Method for Scoring the Pressey X–O Test ... 841

C. H. LAWSHE, JR. A Nomograph for Estimating the Validity of Test Items ... 846

EDWARD N. HAY AND ARLINE M. BLAKEMORE. Comparison of Otis and Alpha Test Scores Made by Bank Clerks ... 850

EDWARD N. HAY AND ARLINE M. BLAKEMORE. Testing Clerical Applicants ... 852

News and Notes ... 856

Book Reviews ... 859

New Books and Pamphlets ... 873

Index of Subjects ... 874

Index of Authors ... 886

A COMPARISON OF THE INTERESTS AND PERSONALITY TRAITS OF ENGINEERS AND LIBERAL ARTS STUDENTS

CHARLES H. GOODMAN
The Pennsylvania State College

DESPITE the numerous studies that have been reported on the Strong Vocational Interest Blank and the Bernreuter Personality Inventory, few of them have sought to learn whether there are any significant differences between the interests or personality traits of groups that are following different courses of collegiate study. The author's purpose for this investigation was to learn whether it would be possible to differentiate between Engineering students and Liberal Arts students on the basis of specified interests and certain personality traits as measured by the Strong (2) Vocational Interest Blank and the Bernreuter (1) Personality Inventory.

SUBJECTS

The selection of a population from these two Schools was made because of the decided differences in curricula which these students follow at The Pennsylvania State College. There are also marked differences in their abilities as indicated by their test scores on the Thurstone (4) Primary Mental Abilities Tests (Experimental Edition). The author has found the differences between the two Schools to be statistically significant, favoring the Engineers on most of the abilities.

Two hundred and thirty-seven male freshman Engineers and one hundred and sixty-six male freshman Liberal Arts students who entered the College in 1940 served as subjects. The number of cases given for each group represents the total 1940 enrollment of male freshmen in each School. The sub-

TABLE 1

Distribution of the Letter Grade Scores Made by the Engineers and Liberal Arts Students on the Strong Occupations in Terms of Per Cents

Group	Occupation	C		C+		B−		B		B+		A	
		% Eng.	% L.D.	% Eng.	% L.D.	% Eng.	% L.D.	% Eng.	% L.D.	% Eng.	% L.D.	% Eng.	% L.D.
I	Physician	25.9	59.5	18.5	18.1	20.2	9.7	18.5	6.6	7.9	1.8	8.8	4.2
	Dentist	20.7	62.0	18.1	19.3	26.8	7.2	19.8	6.6	9.7	3.0	4.8	1.8
	Psychologist	80.5	88.4	11.9	6.1	5.3	2.4	2.2	1.2	0.0	1.2	0.0	.06
	Architect	40.0	77.6	14.5	6.7	21.7	9.0	15.4	3.6	6.1	.06	2.2	2.4
	Artist	58.1	68.0	18.4	15.1	14.0	9.6	6.6	4.2	1.8	1.2	1.0	1.8
II	Chemist	12.7	69.8	11.1	14.5	13.6	4.2	15.4	6.0	15.5	3.0	31.6	2.4
	Engineer	3.9	68.0	8.8	12.7	12.8	8.4	10.2	4.8	17.2	4.2	47.0	1.8
	Mathematician	53.7	89.0	18.9	6.1	11.9	3.0	9.3	1.2	5.7	0.0	0.4	.06
III	Production manager	0.4	21.6	0.4	18.7	6.6	24.7	15.9	18.0	21.2	12.1	55.4	4.8
IV	Farmer	2.2	25.8	5.3	14.5	11.4	16.9	14.9	15.0	24.7	19.9	41.4	7.8
	Forest service man	22.0	61.4	20.7	11.5	16.3	10.2	18.9	9.0	13.2	4.2	8.8	3.6
	Carpenter	15.4	67.4	12.7	12.7	18.9	8.4	14.1	5.4	20.3	2.4	18.5	3.6
	Printer	5.3	10.8	4.4	10.9	14.9	21.7	16.7	23.5	25.2	18.0	33.4	15.0
	Policeman	3.9	16.8	6.2	14.5	17.2	15.6	26.9	19.3	18.9	20.5	26.8	13.2
	Mathematics—physical science teacher	9.7	29.4	9.2	15.7	18.5	21.1	15.8	13.2	21.6	13.1	25.1	7.2
V	Y.M.C.A. secretary	73.9	48.7	11.4	12.1	7.0	11.5	5.3	12.0	1.3	8.4	1.0	7.2
	Personnel manager	50.6	33.7	9.3	16.3	17.6	16.9	11.0	9.6	6.6	13.8	4.8	9.6
	Y.M.C.A. physical director	39.1	28.2	17.2	19.9	14.9	13.9	13.3	15.7	8.4	10.2	7.0	12.0

TABLE 1—(*Continued*)

Group	Occupation	C		C+		B−		B		B+		A	
		% Eng.	% L.D.	% Eng.	% L.D.	% Eng.	% L.D.	% Eng.	% L.D.	% Eng.	% L.D.	% Eng.	% L.D.
	Minister	85.4	68.6	8.4	10.9	3.5	6.0	2.2	7.2	.04	5.4	0.0	1.8
	Social science high-school teacher	58.9	19.2	13.3	15.1	11.0	15.1	9.7	14.5	3.5	9.6	3.5	26.4
	City school superintendent	88.0	58.3	7.1	13.8	2.2	9.1	1.3	10.3	1.3	3.6	0.0	4.8
VI	Musician	39.1	29.4	16.4	18.7	20.3	14.5	9.2	12.1	8.8	7.2	6.1	18.0
VII	Certified public accountant	64.2	40.3	17.5	18.1	13.6	20.5	3.1	11.4	.04	4.8	1.3	4.8
VIII	Accountant	24.6	22.8	18.1	16.9	18.0	14.5	17.6	15.7	12.8	13.2	8.8	16.8
	Purchasing agent	5.7	9.6	11.0	10.9	18.0	22.9	23.8	18.1	22.9	16.8	18.5	21.6
	Banker	35.6	13.8	29.9	13.3	17.7	16.9	10.2	19.3	3.5	13.2	3.0	23.4
	Office man	12.8	5.4	14.9	6.1	17.1	10.8	18.6	20.5	19.3	15.0	17.2	42.1
IX	Sales manager	31.2	8.4	24.3	13.3	20.3	19.3	14.1	17.5	3.9	15.6	6.1	25.8
	Real estate salesman	7.9	2.4	19.8	4.3	27.3	12.7	22.9	21.6	11.9	24.6	10.1	34.3
	Life insurance salesman	50.6	9.0	18.5	10.9	14.1	19.3	10.6	16.9	5.7	17.4	.04	26.4
X	Advertising man	45.3	16.2	26.8	13.3	16.7	22.3	7.0	20.5	3.1	13.8	1.0	13.8
	Author-journalist	39.1	29.4	29.6	21.7	21.6	21.1	7.0	15.1	2.2	9.0	0.4	3.6
	Lawyer	49.2	22.2	24.3	13.9	15.9	19.3	8.4	19.9	1.7	13.8	.04	10.8
XI	President, manufacturing concern	18.5	30.1	13.3	19.3	25.1	18.1	21.1	15.6	12.7	10.2	9.2	6.6

jects were among the 1,215 freshmen tested during "Freshman Week" as part of the College Guidance Program.* The freshmen entering the College cannot be considered as a random sampling of the general population of Pennsylvania. Because of the limited facilities of the College, only sixty-four per cent of the high-school graduates who seek admission are accepted. Admission is based upon high-school record and college aptitude tests. Those students admitted are mainly from the upper forty per cent of the high-school population in achievement. This selection has, therefore, affected the population of this study and limited the general applicability of the results.

PROCEDURE

The battery of tests given each student consisted of the Thurstone (4) Primary Abilities Tests (Experimental Edition), the Strong (2) Vocational Interest Blank, and the Bernreuter (1) Personality Inventory. All of the tests were scored by means of IBM electrical test scoring machines. No further mention will be made of the Thurstone (4) Primary Mental Abilities Tests since the results of these tests will be reported in a future paper.

The Strong (2) Interest Blanks were scored for thirty-four occupations. Treatment of the letter grade scores consisted of tabulating for each occupation the number of Engineers who made letter grade "A," "B," and so on for each of the six letter grades. The number of cases in each letter grade score was then converted into its equivalent percentage of the total number of Engineers. This same process was also carried out for the Liberal Arts students. These percentage tabulations are shown in Table 1 which has been arranged in the same groups of occupations used by Strong (3). The percentage distributions are also shown graphically in Figures 1 to 34. The histograms for the Engineers are shown in solid lines,

* The Pennsylvania State College Guidance Program is under the direction of Professor Robert G. Bernreuter, to whom the author is greatly indebted for his aid in carrying out this investigation.

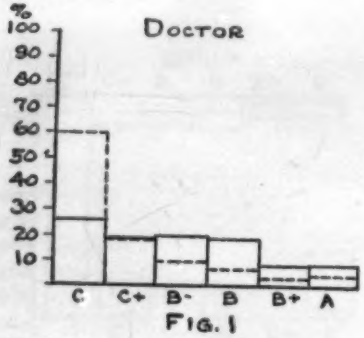


FIG. 1

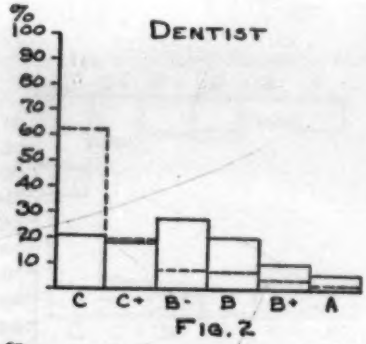


FIG. 2

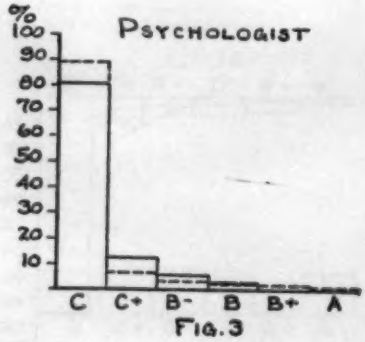


FIG. 3

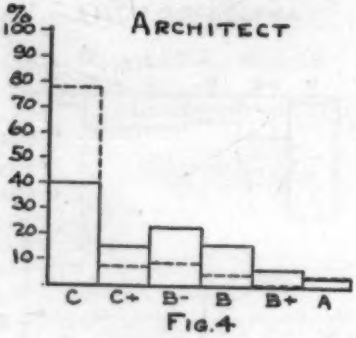


FIG. 4

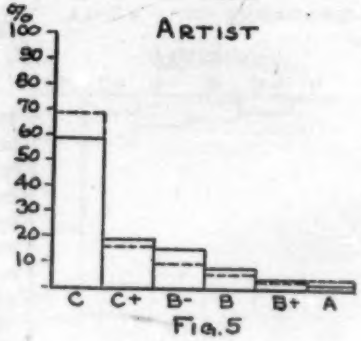


FIG. 5

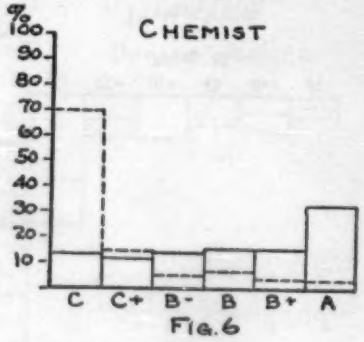


FIG. 6

KEY ENGINEERS ——— LOWER DIVISION - - - - - -

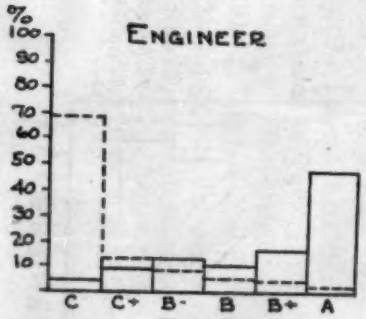


FIG. 7

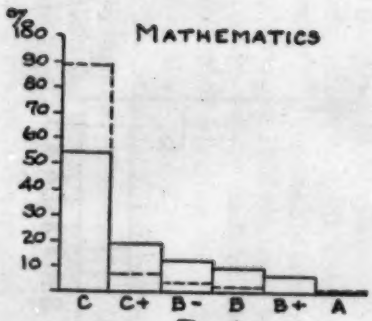


FIG. 8

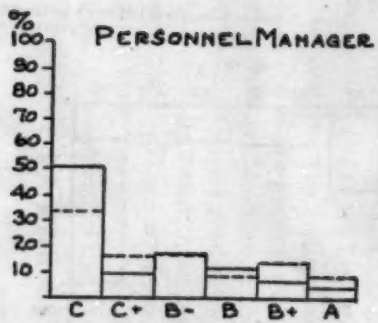


FIG. 9

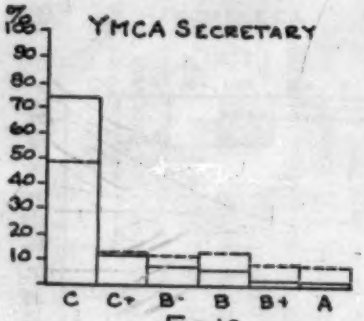


FIG. 10

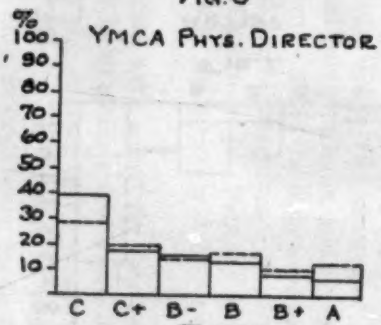


FIG. 11

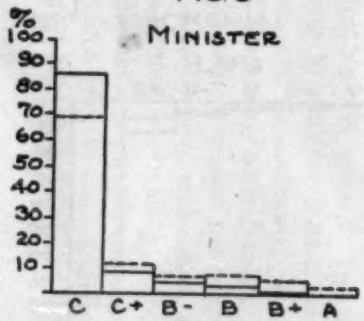


FIG. 12

KEY ENGINEERS ——————
LOWER DIVISION - - - - - -

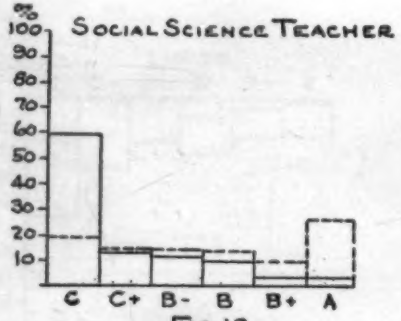


FIG. 13

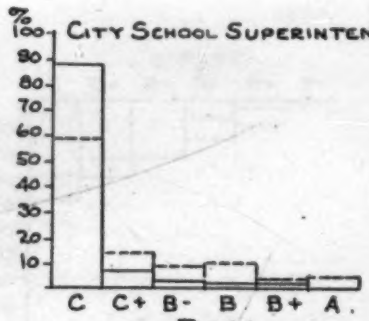


FIG. 14

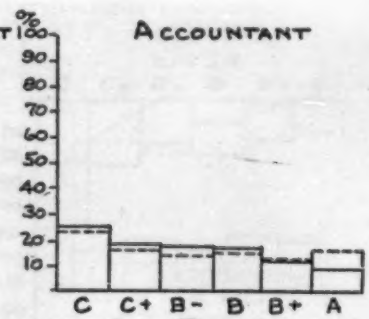


FIG. 15

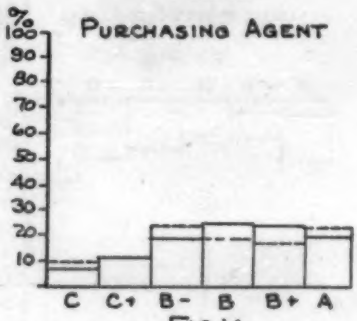


FIG. 16

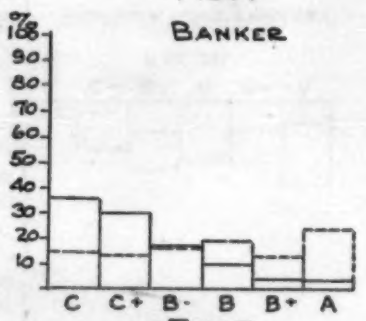


FIG. 17

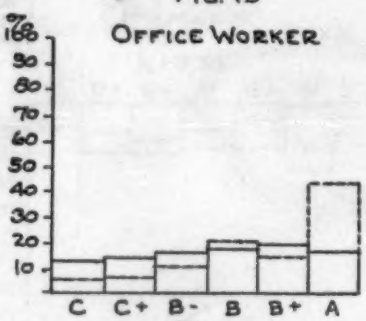


FIG. 18

KEY ENGINEERS ——— LOWER DIVISION ------

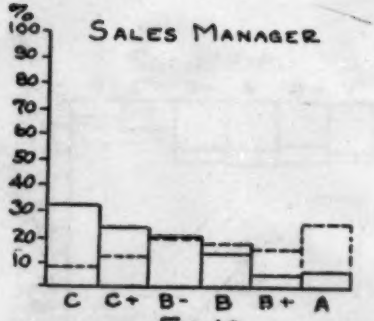


Fig. 19

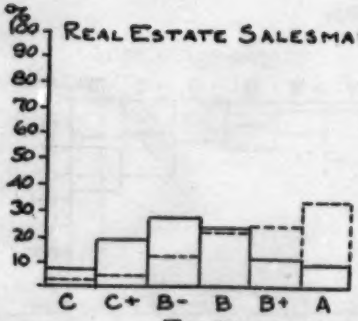


Fig. 20

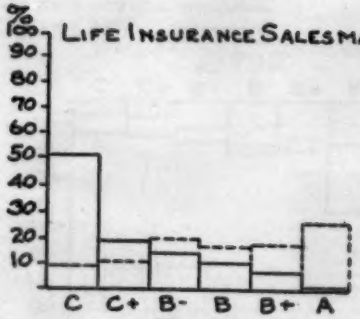


Fig. 21

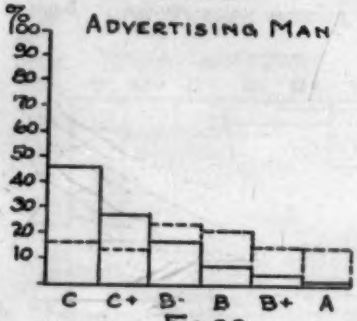


Fig. 22

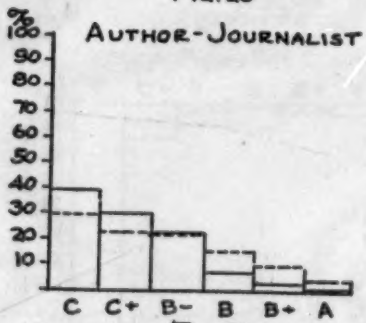


Fig. 23

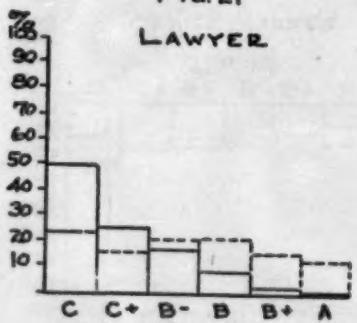


Fig. 24

KEY ENGINEERS ——— LOWER DIVISION - - - - - -

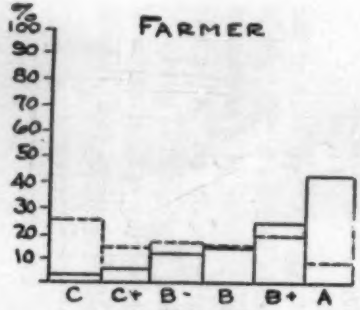


FIG. 25

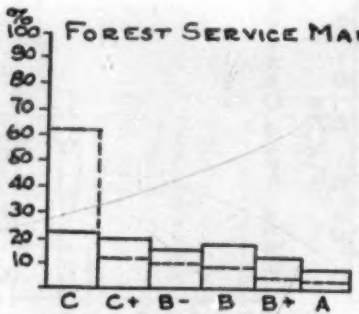


FIG. 26

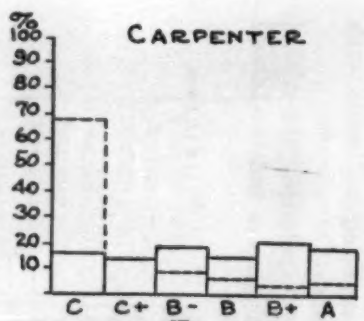


FIG. 27

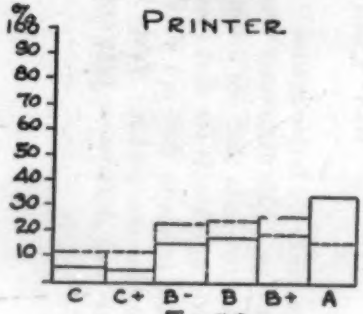


FIG. 28

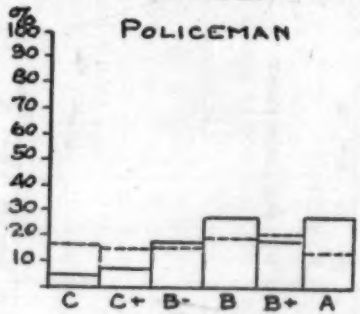


FIG. 29

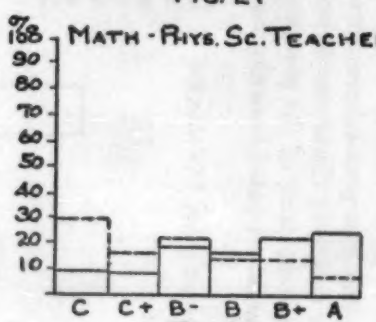


FIG. 30

KEY ENGINEERS ——— LOWER DIVISION - - - - - -

while those of the Liberal Arts students are shown in broken lines. The histograms have been superimposed upon each other to facilitate visual comparisons.

Upon completion of the percentage tabulations, the critical ratios were computed between the Engineers and the Liberal

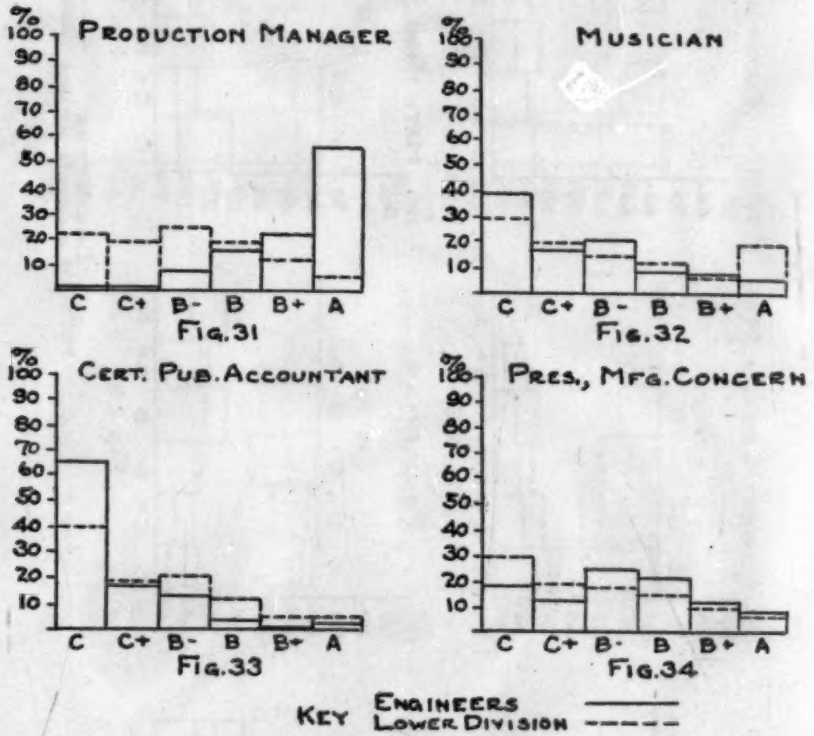


Fig. 31 Fig. 32 Fig. 33 Fig. 34

Arts students for letter grades "C" and "A" on each of the occupations. This dichotomy was made because a "C" grade indicates interests that are dissimilar to those of a successful group of individuals for that occupation, while an "A" grade indicates interests that are similar to a successful group of men in that occupation. Table 2 shows the critical ratios of the per cent differences between the Engineers and Liberal

TABLE 2

Critical Ratios of the Per Cent Scores between the Engineers and Liberal Arts Students on the Strong Occupations

Group	Occupation	C	A
I	Physician	− 7.55	+ 1.81
	Dentist	− 9.76	+ 1.42
	Psychologist	− 2.35	− 1.66
	Architect	− 8.63	± 0.00
	Artist	− 2.17	− 9.90
II	Chemist	−14.25	+ 9.35
	Engineer	−18.05	+13.63
	Mathematician	− 9.00	± 0.00
III	Production manager	− 6.56	+14.70
IV	Farmer	− 7.27	+18.91
	Forest service man	− 8.86	+ 1.81
	Carpenter	−12.68	+ 5.00
	Printer	− 2.08	+ 4.50
	Policeman	− 4.66	+ 3.51
	Mathematics—physical science teacher	− 5.26	+ 5.80
V	Y.M.C.A. secretary	+ 5.31	− 3.33
	Personnel manager	+ 3.69	− 2.27
	Y.M.C.A. physical director	− 2.34	− 1.85
	Minister	+ 4.14	− 2.00
	Social science high-school teacher	+19.06	− 6.76
	City school superintendent	+ 7.14	− 2.85
VI	Musician	+ 2.17	− 3.87
VII	Certified public accountant	+ 5.58	− 2.66
VIII	Accountant	+ 0.48	− 2.58
	Purchasing agent	− 1.81	− 1.00
	Banker	+ 5.78	− 6.06
	Office man	+ 2.91	− 5.81
IX	Sales manager	+ 6.41	− 5.55
	Real estate salesman	+ 2.94	− 6.31
	Life insurance salesman	+11.08	− 7.57
X	Advertising man	+ 7.07	− 5.41
	Author-journalist	+ 2.17	− 2.14
	Lawyer	+ 6.13	− 4.09
XI	President, manufacturing concern	− 2.92	+ 0.83

Arts students for letter grades "C" and "A" on each of the occupations. A minus sign in front of a ratio indicates that the ratio favors the Liberal Arts students while a plus sign indicates that the ratio favors the Engineers. This table has also been arranged according to the groups of occupations used by Strong (3).

The Bernreuter (1) Personality Inventory was scored for the traits of "nervous instability" (B1–N), "self-sufficiency" (B2–S), and "dominance" (B4–D). The procedure used for the Bernreuter Personality Inventory consisted of computing the means and sigmas for the Engineers and Liberal Arts students on the traits of "nervous instability" (B1–N), "self-sufficiency" (B2–S), and "dominance" (B4–D). The means and sigmas were calculated from the raw machine scores and are shown in Table 3. In order to determine whether the differences between the means of the two Schools were significant the critical ratios were computed for each of the traits. The ratios are shown in Table 4.

TABLE 3

Means and Sigmas in Raw Scores for the Engineers and Liberal Arts Students on the Bernreuter Personality Inventory

Group	'dominance' Mean	'dominance' Sigma	'neuroticism' Mean	'neuroticism' Sigma	'self-sufficiency' Mean	'self-sufficiency' Sigma
1940 Engineers	295.10	58.00	199.90	72.40	254.90	43.20
1940 Liberal Arts	290.30	64.00	233.90	81.20	241.30	49.40

TABLE 4

Critical Ratios of the Means between the Engineers and Liberal Arts Students on the Bernreuter Personality Inventory

Group	'dominance'	'stability'[1]	'self-sufficiency'
1940 Engineers	.69	3.88	2.57
1940 Liberal Arts			

[1] Neuroticism scores converted to stability.

RESULTS

Examination of Table 2 will disclose that the critical ratios range from 0.00 to 19.06. Of the thirty-four ratios for letter grade "C" on the Interest Blank only eleven are less than 3.00. Of these eleven ratios nine are above 2.00. This would seem to indicate that the Strong (2) interests differentiate clearly between the Engineers and the Liberal Arts students on letter grade "C." Eighteen of the critical ratios are significant for letter grade "A." Six of the remaining sixteen ratios are above 2.00. It would appear that the two Schools can also be differentiated on letter grade "A." Letter grade "C" appears to differentiate better than letter grade "A" between the two Schools.

Examination of the occupational groups of Table 2 shows that the critical ratios are found to operate along definite lines. If the ratios favor the Engineers on letter grade "A" then the ratios will favor the Liberal Arts students on letter grade "C" or vice versa. This is to be expected since both a positive "A" ratio and a negative "C" ratio would indicate that the Engineers have more in common with the successful men of that occupation than do the Liberal Arts students. There are four occupations in which this trend is not maintained. They are the occupations of Psychologist, Artist, Y.M.C.A. physical director, and Purchasing agent. Here both the letter grade "A" and "C" ratios favor the Liberal Arts students. However, none of these divergencies appear to be significant since the highest ratio is only 1.85 for "A" grades.

Further observation of Table 2 will disclose that certain groups of occupations appear to be most significant for the Engineers, while other groups of occupations appear to be most important for the Liberal Arts students. It will also be noted that the Engineers and Liberal Arts students have interests on certain occupations within these groups which are very similar to those of the successful individuals of these occupations. At the same time the Engineers are most dissimilar to the Liberal Arts students on these same occupations and vice versa.

The occupations of groups II, III, and IV appear to be most significant for the Engineers. In group II the Engineers appear to have interests more similar to successful men in the occupations of Chemist and Engineer than the Liberal Arts students. On the third occupation of this group, Mathematician, the ratio of letter grade "C" favors the Liberal Arts students, but there is no difference between the two Schools on letter grade "A." In group III the interests of the Engineers are more similar to those of the successful men in the occupation of Production Manager than are the Liberal Arts students. This is also true for the occupations of group IV, where the interests of the Engineers appear to be more similar to the successful individuals in the occupations of Farmer, Mathematics-physical science teacher, Carpenter, Printer, Policeman, and Forest service. On this last occupation the "A" ratio favors the Engineers but it is not significant. The occupations of Physician and Dentist in group I and the occupation of President of a Manufacturing concern in group XI seem to favor the Engineers, but the letter grade "A" ratios for these occupations are not significant.

The interests of the Liberal Arts students seem to be more like those of the successful individuals in the occupations of groups V, VI, VII, VIII, IX, and X than are the interests of the Engineers. Although all of the ratios favor the Liberal Arts students in these occupational groups, the ratios for the occupations of Personnel manager, Y.M.C.A. physical director, Minister and City school superintendent of group V are not significant on letter grade "A." This is also true for the occupations of Accountant and Purchasing agent of group VIII, and Author-Journalist of group X.

The Engineers appear to be most significantly different to the Liberal Arts students on letter grade "A" for the occupations of Farmer, Production Manager, Engineer, Chemist, Mathematics-physical science teacher, and Policeman. The critical ratios for these eight occupations range from 14.70 for Production Manager to 3.51 for Policeman. The Liberal Arts

students are most different from the Engineers in their interests on the occupations of Life insurance salesman. Office man, Advertising man, Lawyer, Social-science high school teacher, Real estate salesman, and Musician. The critical ratios for these seven occupations range between 7.57 for Life insurance salesman to 3.87 for Musician.

The histograms showing the distributions of the interest scores for the Engineers and Liberal Arts students on Figures 1 to 34 present some items of interest. Few if any of the thirty-four distributions approximate anything like normal distributions. The trend is rather for the modal value to be at one of the extremes of the distribution, that is for letter grade "A" or letter grade "C." This tends to give the curves an "L" shape. On the occupations where the interests of the Engineers and Liberal Arts students appear to be most distinctly different the curves appear as two "L's" facing each other. This can be clearly seen for the occupations of Chemist, Figure 6; Engineer, Figure 7; Social-science high-school teacher, Figure 13; Banker, Figure 17; and Farmer, Figure 25.

Table 4 shows the critical ratios found between the Engineers and Liberal Arts students on the Bernreuter (1) Personality Inventory for the traits of "nervous instability," "self-sufficiency," and "dominance." The most significant difference appears for the trait of nervous instability where the ratio is significant, favoring the Liberal Arts students. Interpreted in positive terms it would seem to indicate that the Engineers are more "stable" as a group than are the Liberal Arts students. The Engineers also appear to be more "self-sufficient" than the Liberal Arts students. On the trait of "dominance" the ratio favors the Engineers but it cannot be considered a significant difference.

SUMMARY

This study of the comparison of specified interests and certain personality traits of Engineering and Liberal Arts students, as measured by the Strong (2) Vocational Interest

Blank and the Bernreuter (1) Personality Inventory seems to justify the following conclusions.

(1) The interests measured by the Strong Vocational Blank appear to differentiate rather clearly between the Engineers and Liberal Arts students. Letter grade "C" appears to discriminate more clearly between these two Schools than does letter grade "A."

(2) The differences between the interests of the Engineers and Liberal Arts students on the occupations of Chemist, Engineer, Production Manager, Farmer, Carpenter, Printer, Policeman, and Mathematics-physical science teacher are statistically significant and favor the Engineers. The interests of the Engineers are most similar to the successful men on these same occupations, while the interests of the Liberal Arts students are dissimilar.

(3) The interests of the Liberal Arts students appear to be similar to those of the successful individuals in the occupations of Y.M.C.A. secretary, Social-science high-school teacher, Musician, Banker, Office man, Sales manager, Real estate salesman, Life insurance salesman, Advertising man, and Lawyer. On the other hand the interests of the Engineers are dissimilar to those of the successful individuals in these same occupations. The differences between the interests of the Liberal Arts students and the Engineers on the above occupations are statistically significant, the ratios favoring the Liberal Arts students.

(4) On the Bernreuter Personality Inventory the Engineers are found to be more "stable" than the Liberal Arts students. The difference between the two Schools on this trait is statistically significant. The Engineers as a group also appear to be more "self sufficient" than the Liberal Arts students. There is no significant difference between the two Schools on the trait of "dominance."

BIBLIOGRAPHY

1. Bernreuter, Robert G. *The Personality Inventory.* Stanford University Press, Stanford University, California, 1931.

2. STRONG, EDWARD K. *The Vocational Interest Blank for Men.* Stanford University Press, Stanford University, California, 1940.
3. STRONG, EDWARD K. *Manual for Vocational Interest Blank for Men.* Stanford University Press, Stanford University, California, 1940, p. 2.
4. THURSTONE, L. L. *Primary Mental Abilities Tests (Experimental Edition).* American Council on Education, Washington, D. C., 1938.

A STUDY OF INTEREST PATTERNS OF SUCCESSFUL AND UNSUCCESSFUL HOME ECONOMICS STUDENTS ENTERING COLLEGE WITH SIMILAR ACHIEVEMENT AND APTITUDE

MARGARET MERCER

Rockland State Hospital, Orangeburg, N. Y.

A STUDY of records in the New York State College of Home Economics shows that many students entering with the same or nearly the same regents average and rank in the same university decile on the American Council Psychological Examination differ in academic achievement. It has been the experience of the class counselors, each one of whom works closely with all members of a given class during their four years in college, that differences are equally marked in social adjustment and probable employability.

It is the purpose of this college to help its students become successful homemakers and responsible, intelligent members of their communities. Most of the girls who marry shortly after being graduated must work before and perhaps after marriage. For them, as well as for the girls who do not marry, ability to get and keep a position is an important outcome of four years in college. The successful student in this college, then, is a girl whose academic achievement in home economics and non-home economics courses is above average, who has participated in the activities of the university community, and who can be recommended without reservation for a position in some area.

It appears probable that if two students enter the home economics college with similar high school averages and with approximately equal aptitude in dealing with verbal and quan-

titative relationships, differing college success may be due to the fact that one student is better adapted to the college curriculum and the extra-curricular demands of the university environment. The increasing popularity of home economics as the college girl's curricular choice makes it desirable to attempt to determine a means of predicting such adaptation.

It must be recognized that while home economics may have a contribution to make to the general education of every girl, the college curriculum in home economics is not one in which every girl will be happy or successful. High school counselors, parents, and the girls themselves frequently fail to make this distinction. In consequence home economics, like other special curricula, deals frequently with the misfit student.

It is the purpose of this paper to investigate the interest patterns of successful and unsuccessful students entering the college with the same or nearly the same regents average and rank in the American Council Psychological Examination. It is hoped that this investigation may furnish some material for an aptitude test in home economics which may identify on entrance to college students needing special help in adjustment.

Examination of records of two classes resulted in the selection of sixty pairs of students who entered college with (1) similar high school achievement as represented by the regents average, and (2) similar college aptitude as indicated by the same or nearly the same university decile rank in the American Council Examination. In the university, however, these pairs of students had shown differences in (1) academic achievement in home economics and non-home economics courses as indicated by the general average at the end of the sophomore year, or, in the case of several students in the unsuccessful group, to the time of leaving; (2) participation in activities of the university community; (3) probable employability as indicated by summer job reports, achievement in the field of professional concentration, willingness of the class

TABLE 1

Pairs of Successful and Unsuccessful Students with Similar Regents Average and Rank on American Council Psychological Examination

Student	Cornell decile Amer. Council	Regents average	College average	Student	Cornell decile Amer. Council	Regents average	College average
U 1	III	91	78	S 1	IV	93	84
U 2	III	88	77	S 2	III	87	82
U 3	III	92	73	S 3	III	92	83
U 4	IX	86	76	S 4	IX	87	79
U 5	VIII	80	73	S 5	VIII	80	80
U 6	IX	84	74	S 6	IX	86	81
U 7	II	85	66	S 7	II	84	81
U 8	V	89	75	S 8	V	89	83
U 9	X	76	68	S 9	X	76	79
U 10	III	84	73	S 10	III	81	82
U 11	IV	86	75	S 11	IV	87	81
U 12	VIII	78	68	S 12	VIII	77	80
U 13	V	81	73	S 13	V	79	79
U 14	III	86	75	S 14	III	85	81
U 15	V	85	77	S 15	V	84	82
U 16	VI	85	77	S 16	VI	87	87
U 17	VII	86	74	S 17	VI	85	80
U 18	VII	83	70	S 18	VII	84	79
U 19	VII	85	76	S 19	VII	87	80
U 20	IV	82	75	S 20	IV	82	79
U 21	VI	83	74	S 21	VI	85	80
U 22	VI	89	78	S 22	VI	89	82
U 23	IV	87	66	S 23	IV	87	80
U 24	VIII	78	76	S 24	VIII	79	83
U 25	VIII	85	68	S 25	VIII	89	81
U 26	IX	78	72	S 26	IX	80	77
U 27	VII	90	76	S 27	VII	87	80
U 28	VI	87	73	S 28	VI	83	83
U 29	V	84	73	S 29	V	84	75
U 30	IV	87	77	S 30	IV	85	86
U 31	II	88	78	S 31	II	88	82
U 32	IX	81	69	S 32	IX	81	79
U 33	X	76	73	S 33	X	75	74
U 34	VII	77	75	S 34	VII	79	78
U 35	IX	82	77	S 35	IX	81	79
U 36	VII	88	74	S 36	VII	88	81
U 37	VI	86	70	S 37	VI	84	78
U 38	VIII	84	71	S 38	VII	84	80
U 39	IX	85	70	S 39	IX	87	76
U 40	VI	82	72	S 40	VI	81	78
U 41	V	84	77	S 41	IV	86	78

TABLE 1.—(*Continued*)

Student	Cornell decile Amer. Council	Regents average	College average	Student	Cornell decile Amer. Council	Regents average	College average
U 42	III	88	76	S 42	IV	91	87
U 43	IV	85	75	S 43	III	86	80
U 44	IX	92	77	S 44	IX	90	78
U 45	VII	85	75	S 45	VII	82	79
U 46	I	93	80	S 46	I	95	85
U 47	VI	91	72	S 47	IV	94	82
U 48	I	90	76	S 48	I	94	86
U 49	VII	91	79	S 49	VIII	93	83
U 50	I	95	82*	S 50	II	91	80
U 51	IX	83	75	S 51	IX	81	77
U 52	I	88	72	S 52	I	90	84
U 53	V	94	78	S 53	V	93	81
U 54	I	91	83*	S 54	II	93	83
U 55	IV	85	76	S 55	IV	88	80
U 56	V	86	76	S 56	V	87	85
U 57	IV	92	73	S 57	IV	95	86
U 58	IV	88	75	S 58	IV	87	79
U 59	III	93	73	S 59	III	93	83
U 60	V	90	70	S 60	IV	81	80

* In these two cases the girls had maintained superior academic standing to the end of the sophomore year. U 50 and U 54 disliked home economics intensely, frankly admitted that they enrolled in the course because of free tuition, and left after two years. The same is true of U 46 though she has remained in college.

counselor to recommend for a position, reports received by the class counselor from instructors.

The groups of successful and unsuccessful students were designated as groups S and U. An analysis was made of the responses of the two groups on the Strong Vocational Interest Test following Ream's method. The per cent of each group marking each symbol and the difference in percentages between the groups were found. The standard error of the difference was computed by Yule's formula. The item was retained for further study if the difference was one or more times the standard error of the difference (that is, the chances were at least 84 in 100 of a true difference in response between such groups if the numbers in each were increased).

Table 1 shows the regents average, university rank on the American Council Psychological Examination, and college average to the end of the sophomore year for the successful and unsuccessful groups.

Of the 410 items on the Strong Vocational Interest Blank for Women, 198 were found to differentiate between the groups.

Part I of the test lists 128 occupations for which the subject indicates like, indifference, or dislike. She is told to disregard considerations of salary, social standing and future advancement and to consider only whether she would like to do what is involved in the occupation regardless of any necessary skills, abilities, or training which she may or may not possess.

Table 2 shows the items for which the like or dislike of the two groups is statistically significant. According to the plan of this study, the response is regarded as significant if the difference of response between the successful and unsuccessful groups is one or more times the standard error of the difference (that is, the chances were at least 84 in 100 of a true difference in response between such groups if the numbers in each were increased). Items starred are those which one group likes and the other dislikes.

Examination of Table 2 shows marked differences in the number of items in which the response of the groups was significant as well as in the type. It is interesting to notice that the U group expresses dislike for the professions of dietitian, social worker, and teacher which are main vocational outlets for the home economics graduate. The occupational preferences listed by the unsuccessful group appear to form a pattern usually associated with childish day dreams—movie actress, artist's model, axiatrix, professional dancer, and secret service woman.

Part II of the Strong Vocational Interest Blank lists 44 amusements for which the subject indicates like, indifference, or dislike as in Part I.

The likes and dislikes of the successful and unsuccessful

TABLE 2

Likes and Dislikes of Occupations Indicated by Successful and Unsuccessful Home Economics Students Entering College with Similar Achievement and Aptitude

Occupations liked		Occupations disliked	
U group	S group	U group	S group
movie actress	accountant	author of children's books	advertiser
artist	bacteriologist	bookkeeper	architects
*artist's model	*dietitian	dean of women	*artist's model
*aviatrix		*dietitian	*aviatrix
*cartoonist		dressmaker	*cartoonist
*costume designer			*costume designer
government clerk	foreign correspondent	governess	*illustrator
governor of a state	landscape gardener	hostess	*manikin
*illustrator	*musician	missionary	
interpreter		*musician	
laboratory technician		naturalist	
lawyer, corporation		office manager	
lawyer, criminal			
*manikin			
office clerk			
physician			
politician	*radio program director	*radio program director	*professional dancer
postmistress	*social worker	real estate sales	*psychiatrist
probation officer	wife	*social worker	psychologist
proof reader		teacher, home ec.	*secret service
*professional dancer		teacher, high school	wholesaler
*psychiatrist		teacher, music	
radio singer		vocational counselor	
registrar		YWCA secretary	
reporter (general)			
scenario writer			
scientific illustrator			
*secret service			
specialty sales			
stock broker			
teacher, dancing			
telephone operator			

groups are shown in Table 3. Items starred are those which one group likes and the other dislikes. Items are regarded as showing significant group reaction if the difference of response between the successful and unsuccessful group is one or more times the standard error of the difference (*i.e.*, the chances are 84 in 100 that a true difference exists).

TABLE 3

Likes and Dislikes of Amusements Indicated by Successful and Unsuccessful Home Economics Students Entering College with Similar Achievement and Aptitudes

Amusements liked		Amusements disliked	
U group	S group	U group	S group
financial page	take long walks	*auto travel	golf
detective stories	observing birds	*playing musical instruments	poker
*movie magazines	*auto travel	*symphony concerts	fortune tellers
*"True Story"	*playing musical instruments	*movies	*movie magazines
	*art galleries		"Atlantic Monthly"
	attending lectures		"New Republic"
	*symphony concerts		*"True Story"
	*movies		
	"House & Garden"		
	"Ladies Home Journal"		

It is interesting to compare Table 3 with Table 2. Part I of the Strong Test gave the groups opportunity to express interest in activities which they had had, for the most part, no opportunity to experience. The unsuccessful group indicated more than three times as many preferences as the successful group. In Part II of the Strong Test the subjects express reactions to amusements with which, for the most part,

they have had some contacts. Here the successful group expresses more likes and dislikes. The unsuccessful group has

TABLE 4

Likes and Dislikes of Activities Indicated by Successful and Unsuccessful Home Economics Students Entering College with Similar Achievement and Aptitude

Activities liked		Activities disliked	
U group	S group	U group	S group
	*head of civic improvement program	*head of civic improvement program	
	*giving first aid assistance	*giving first aid assistance	
	*raising flowers & vegetables	*raising flowers & vegetables	
	*doing your own laundry work	*doing your own laundry work	
	arguments	interviewing clients	
	*making a speech	*making a speech	
	*cooking	*cooking	
	organizing a play	sewing	
	preparing dinner for guests		
	*teaching children	*teaching children	
	*teaching adults	*teaching adults	
	reading editorial columns		
	meeting & directing people		
	taking responsibility		
	*trying new recipes	*trying new recipes	
	looking at shop windows	continually changing activities	
	regular hours of work		
	*saving money	*saving money	

indicated a liking for movie magazines and "True Story," coinciding with their preferences expressed in Part I for

movie actress, artist's model, manikin, radio singer, and professional dancer.

Part III of the Strong Vocational Interest Blank lists 45 activities for which the subject indicates like, indifference, or dislike.

The likes and dislikes of the successful and unsuccessful groups are shown in Table 4. Items starred are those which one group likes and the other dislikes. Items are regarded as showing significant group reaction if the difference in response between the successful and unsuccessful group is one or more times the standard error of the difference (*i.e.*, the chances are 84 in 100 that a true difference exists).

Part III of the Strong Blank again offers the subject the opportunity of expressing herself on activities with which she has had experience. On ten items the groups express opposite reactions. All of them are those to which one might expect favorable reactions from a young woman interested in home economics. It is interesting to note that the S group has expressed significant positive responses to many items and no negative responses, while the U group has expressed negative responses entirely.

Part IV of the Strong Vocational Interest Blank lists 46 peculiarities of people for which the subject indicates like, indifference, or dislike. The likes and dislikes of the successful and unsuccessful groups are shown in Table 5. Items starred are those which one group likes and the other dislikes. Items are regarded as showing significant group reaction if the differences of response between the successful and unsuccessful groups is one or more times the standard error of the difference (*i.e.*, the chances are 84 in 100 that a true difference exists).

Table 5 shows the S group liking progressive, thrifty, religious people while the U group dislikes them. The U group likes unconventional, carelessly dressed people who take chances on situations of doubtful outcome. The S group expresses dislike for such qualities. Apparently the S group's judgments are more conservative.

TABLE 5

Likes and Dislikes of Peculiarities of People Indicated by Successful and Unsuccessful Home Economics Students Entering College with Similar Achievement and Aptitude

Peculiarities liked		Peculiarities disliked	
U group	S group	U group	S group
intellectual people	*progressive people	*progressive people	emotional people
*people who are unconventional	people who are leaders	very self-confident people	*people who are unconventional
people who take life seriously	*thrifty people	pessimists	
	*religious people	*thrifty people	people who always agree with you
*carelessly dressed people	independents in politics	*religious people	people who talk very loudly
women cleverer than you	teetotalers		*carelessly dressed people
people who chew gum			men who are indifferent to you
*people who take chances on situations on doubtful outcome			men who drink
			*people who take chances on situations of doubtful outcome

Part V of the Strong Vocational Interest Blank lists:

a. Ten activities of which the subject checks the three she would enjoy most and the three she would enjoy least.
b. Ten factors affecting work of which the subject checks the three she considers most important and the three least important.
c. The names of ten women of which the subject checks the three she would most like to have been and the three she would least like.
d. Ten positions in a club or society of which the subject checks the three she would most prefer to hold and the three she would least prefer.

Table 6 shows the items for which the difference between the responses of the successful and unsuccessful groups was one

TABLE 6

Activities, Factors Affecting Work, Prominent Women, and Positions in a Club or Society Selected by Successful and Unsuccessful Home Economics Students Entering College with Similar Achievement and Aptitude

S group		U group	
Select	Reject	Select	Reject
a. sell ideal houses	*determine cost of building house	design a new home	
*teach others home furnishing	interest public in building home	discover improvement in design of house	*teach others how to furnish house
		*determine cost of building & furnishing home	
b. *congenial, competent coworkers	salary for work	steadiness & permanence of work	certainty work will be judged by fair standards
	*opportunity to use knowledge & experience	*opportunity to make use of knowledge & experience	freedom in working out one's own methods
			*congenial, competent coworkers
c. *Jane Addams *Madame Curie Edna Ferber	Lillian Gallbraith	Amelia Earhart	*Jane Addams *Madame Curie Madam Schuman-Heinck
d. president of society		member of society	treasurer of society
			chairman of publicity committee

or more times the standard error of the difference (*i.e.*, the chances are 84 in 100 that a true difference exists). Items starred are those which one group likes and the other group dislikes.

Table 6 shows consistent response on the part of the two groups. The S group has continued to indicate interest in teaching, in companions, and in science and social work. The U group rejects all these things and further indicates a passive attitude in reaction to part d.

Part VI of the Strong Vocational Interest Blank lists 38 pairs of items which the subject is asked to check for preference in favor of one or lack of preference. Table 7 indicates the items for which the difference in response between the successful and unsuccessful groups was one or more times the standard error of the difference (*i.e.*, the chances are 84 in 100 that a true difference exists).

Part VI in some ways is the most interesting of all the preference lists because of the sharply defined personality patterns which appear when the preferences of both groups are examined. The S group expresses interest in the occupations of physical education, teaching, and social work. The girls of the S group look forward to marriage, prefer a few intimate friends to many acquaintances, and the quieter forms of recreation. The U group show introverted characteristics in their preference for doing a job themselves, dealing with things rather than people, and in presenting written rather than oral reports. They want more exciting amusements, many acquaintances and prefer to receive a large salary to interesting work for a lower salary.

Part VII of the Strong Vocational Blank is made up of (1) twenty-three statements descriptive of what kind of person the subject is and what she has done (the subject is directed to check the "yes" column if the item really describes her, the "no" column if the item does not describe her, and the "?" column if she is not sure); (2) a seven item three point rating scale on which the subject is asked to classify herself. Table 8

shows the self-ratings of the successful and unsuccessful groups for which the difference in response between the two

TABLE 7

Preferences Expressed by Successful and Unsuccessful Home Economics Students Entering College with Similar Achievement and Aptitude

Preference toward	S	U	Preference toward	S	U
physical education director	x		magazine writer		
statistician			social worker	x	
aviatrix		x	stenographer		
teacher	x		saleswoman		
house to house canvassing		x	retail selling		
develop plans		x	execute plans		
do job yourself		x	delegate job to another		
persuade others			order others		x
evenings with women friends			evenings with men friends		x
deal with things		x	deal with people		
many men friends			few men friends	x	
activity producing tangible return			activity enjoyed for own sake		x
taking a chance			playing safe	x	
*work which interests you, with modest income	x		*work which does not interest you, with large income		x
follow own career after marriage			follow home & social activities after marriage	x	
work involving few details			work involving many details	x	
be married	x		remain single		
*present a report in writing		x	present a report verbally	x	
do own housework			have someone else do housework		x
amusement where there is crowd		x	amusement with one		
*people slow in making decisions	x		people quick in making decisions		x
*nights spent at home	x		nights spent away from home		x
*activities possessing thrills and excitement		x	activities of a conservative nature	x	
*few intimate friends	x		many acquaintances		x

groups was one or more times the standard error of the difference (*i.e.*, the chances are 84 in 100 that a true difference exists).

The U group says frankly "No" to working steadily, self assurance, and promptness for work, agreeing completely with what their instructors have said about them individually.

TABLE 8

Self Ratings of Present Abilities and Characteristics of Successful and Unsuccessful Home Economics Students

Yes		No	
S group	U group	S group	U group
*usually work steadily	*can discriminate between less & more important matters	*can discriminate between less & more important matters	*usually work steadily
quite sure of myself can carry out plans assigned by others	*remember faces, names, incidents better than average	*remember faces, names, incidents better than average	
*always on time for work			*always on time for work
can write concise, well organized report			
plan my work in detail			
*stimulate ambition of associates			*stimulate ambition of associates
lend money to certain acquaintances	lend money to acquaintances		
seldom tell jokes	tell jokes well		

The S group rate themselves positively on the same qualities.

Part VIII of the Strong Vocational Interest Test lists thirty-nine school subjects for which the subject is asked to indicate like, dislike, or indifference. Table 9 shows the subjects for which the successful and unsuccessful groups indicated like

or dislike with the difference in group reaction being one or more times the standard error of the difference.

In reaction to school subjects the S group gives twice as many positive responses as the U group. The S group likes

TABLE 9

School Subjects Liked and Disliked by Successful and Unsuccessful Home Economics Students

Subjects liked		Subjects disliked	
S group	U group	S group	U group
Bible study	art		geography
bookkeeping	*languages	economics	history
botany		English composition	*music
civics		geometry	*public speaking
domestic science		journalism	
dramatics		*languages	
education		physics	
geology		political science	
*music			
physical training			
physiology			
psychology			
*public speaking			
sociology			
typewriting			

music and public speaking. The U group dislikes them. The U group likes languages. The S group does not.

CONCLUSIONS

1. The successful group of students show more positive reactions to activities, amusements, and school subjects, which they have had an opportunity to experience. The unsuccessful group shows more positive reactions on a list of occupations which they have had no chance to know first hand and few positive responses to the activities, amusements, and school subjects with which they have had direct contact.

2. The successful group shows consistent interest in the more prosaic occupations of dietetics, teaching, and social work. The occupational preferences of the unsuccessful group form a pattern usually associated with childish day dreams. They show, too, a preference for escape literature.

3. The successful group apparently accepts conventional standards of judgment in liking thrifty, progressive, religious people. The U group dislikes these qualities and expresses favor for the opposing characteristics.

4. The successful group appears to be more extraverted, interested in the activities and amusements of the college community, and in the occupations for which there is some probability they may enter. The unsuccessful group presents an interest pattern which suggests day dreaming and fantasy. They do not give an impression of concern with everyday affairs or as wide interests in the activities and amusements available.

5. In general, it appears fair to say that the results of this investigation warrant further study. It is planned to administer the Strong Test to the entering freshman class, score it according to the key developed here, and see if it differentiates between successful and unsuccessful students. If it does so, it will be administered to successive entering classes in order to establish norms so that it may be possible to identify on entrance girls who may need special help in adjustment.

MANIPULATIVE PERFORMANCE OF YOUNG ADULT APPLICANTS AT A PUBLIC EMPLOYMENT OFFICE—PART II*

LORENE TEEGARDEN

Department of Psychological Services, Public Schools, Cincinnati, Ohio

Minnesota Spatial Relations Test as a Measuring Instrument.

THIS is a good test with which to open the battery. With appropriate conversation about the test and the job interests of the applicant, it is not difficult to enlist the interest and effort of the subject. However, the problem in this test is less obvious and challenging than are those of the Kent-Shakow test, and for certain people who resent being urged to speed, or make their best efforts only when they begin to face difficulties, the Kent-Shakow is superior as an opening test. For the routine type of worker, on the other hand, or the individual who is self-conscious under observation, the Spatial Relations test may be superior as an opener because of the simpler character of the task, and because it does not require as close observation by the examiner as does the Kent-Shakow. If the preliminary conversation suggests that the applicant may be over-confident, or scornful toward the tests, it is well to begin with the Kent-Shakow. For practically all others the Spatial Relations test is a satisfactory introduction. It is important that the examiner should be alert to the attitudes and reactions of the applicant if he hopes to get the best possible performance. This requires technical training and practical experience, as well as certain personal qualifications.

Table 5 shows the norms for the Spatial Relations test which

* The first part of this study was published in the October, 1942, issue of this Journal.

were developed at the Cincinnati Employment Center. Figure 3 shows the distribution of records on which these norms are based. Although they are less skewed than those for the Kent-Shakow tasks, yet the measure of skewness for each distribution is more than three times its standard deviation, indicating skewness of a significant degree. The difference between the sexes is not significant.

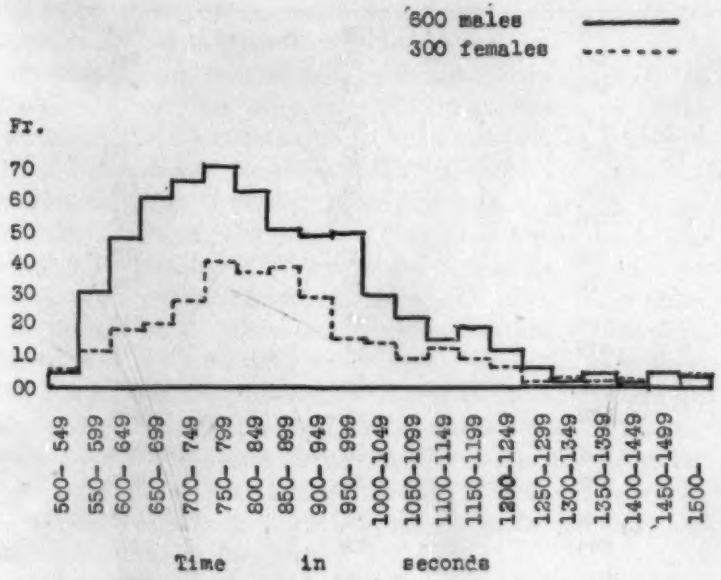


FIG. 3. Distribution of performance time on Minnesota Spatial Relations test.

The Cincinnati norms are somewhat faster than those published by the Employment Stabilization Research Institute for adult performance on boards B, C, and D after a practice trial on board A (2, p. 45). No explanation is offered to account for the more rapid performance of the Cincinnati groups. Though the boards were made of different materials, it is doubtful that that slight difference could account for the increase in speed. All the applicants at the Employment Center

TABLE 5

MINNESOTA SPATIAL RELATIONS

Percentile Distribution of Time Required for Completion of Boards B, C, and D after a Practice Trial on Board A

Males (600 cases)	Percentile	Females (300 cases)
Time in seconds		Time in seconds
500	100	500
593	95	595
628	90	639
657	85	677
682	80	711
707	75	739
730	70	761
753	65	780
774	60	799
796	55	819
819	50	840
844	45	860
872	40	880
902	35	900
933	30	927
964	25	957
995	20	1007
1044	15	1075
1120	10	1137
1208	05	1225
1600	00	1600
825.66	Mean	842.16
191.50	S.D.	194.50
55.0	Skewness	48.0
10.41	$S.D._{sk}$	14.90

were interested in getting jobs, and every effort was made to stimulate interest in the test by explaining its relation to the job. Whether this may have had an influence on the rate of performance it is not possible to say.

The Spatial Relations test affords less opportunity than the Kent-Shakow test to observe qualitative aspects of the applicant's work. Rapidity of movement is readily seen, and since this factor influences the performance time somewhat, the observation should be recorded with the test rating.

Most applicants make a gain on board B over board A. A few do not, and this is an unpromising performance. Many require longer for C than for B, but some gain on C despite the new shapes and the more difficult discrimination required for the second set of blocks. Some gain time on D over C, and some lose. Probably the highest type of performance is that which gains time steadily from board to board. It is not unusual, however, for records to show gain on D after either gain or loss on C. Occasionally one shows loss on board B, but later works more attentively with a resultant gain on C. If the combined time for boards A and B exceeds 14 minutes it is well to omit C and D. The probability that such a performance will rise above the tenth percentile on the entire test is so slight that it is well to use the time for other simple tests on which the applicant may make higher records that may show qualifications for some job.

Of those who react quickly on the Spatial Relations test, it may still be necessary to learn how they react in problem situations. It may be desired to differentiate those who can handle a complicated routine only from those who can vary their procedures to meet the conditions of complicated problems; or to differentiate those who maintain their poise and concentration from those who become impatient or confused when the task cannot be performed quickly and easily by the usual methods. These things can be learned from the Kent-Shakow test, which for this purpose need be given to only a portion of those taking the Spatial Relations test.

The performance time of 150 males on Spatial Relations was correlated with their time on each of the first four tasks (2D, 3S, 4S, 3D) of the Kent-Shakow test. The coefficients ranged from .43 to .46. The correlation between the mean percentile rating on the Kent-Shakow simple problems (2D, 3S, 4S) and the percentile rating on Spatial Relations was, for 150 males, .75; and for 87 females, .67 (Table 9). The groups whose scores were correlated included all ages and the entire range of performance. For these same groups the correlation of Spatial Relations with the mean rating on the Kent-Shakow complicated problems was, for 150 males, .56; and for 87 females it was .48 (Table 9). For the entire range of performance (including 600 males, 500 females) the correlation of simple with complicated problems is .72 or .71 respectively for the two sexes (Table 9 or Table 3, Class I).

From the above correlation we may infer: (1) that the ability measured by the Spatial Relations test is somewhat similar to that measured by the Kent-Shakow simple problems ($r = .75$ and .67 for the two sexes); (2) that it is less similar to the ability measured by the Kent-Shakow complicated problems ($r = .56$ and .48); and (3) that the ability measured by the simple problems is about equally similar to that measured by the complicated problems and to that measured by the Spatial Relations test ($r = .72$ and .75 respectively for males and .71 and .67 respectively for females). This suggests the possibility of using the Kent-Shakow simple problems as a basic test, and supplementing it with either the complicated problems of the Kent-Shakow test or by the Spatial Relations test, but rarely by both.

Minnesota Placing and Turning as a Measuring Instrument.

These tests make little demand upon perception of details. A person who reacts poorly to a multiplicity of details in a complicated routine operation, may, if he moves quickly and with fair accuracy, make a high rating on Placing, and indicate ability to work rapidly at simple repetitive operations

TABLE 6

MINNESOTA PLACING AND TURNING TESTS

Percentile Distribution of Time Required for Completion of Trials 2, 3, 4 and 5

Males (500 cases)			Females (360 cases)	
Placing (Time in seconds)	Turning (Time in seconds)	Percentile	Placing (Time in seconds)	Turning (Time in seconds)
179	130	100	170	120
206	152	95	200	150
212	158	90	206	156
217	164	85	211	161
220	169	80	215	165
223	172	75	218	168
225	175	70	221	171
229	178	65	223	174
231	180	60	225	177
234	183	55	228	180
236	186	50	230	183
238	189	45	233	186
241	192	40	235	189
245	196	35	238	192
249	201	30	241	196
253	206	25	244	201
258	212	20	247	207
263	219	15	251	214
268	226	10	256	222
279	241	05	265	236
340	330	00	320	320
233.4	185.1	Mean	226.6	182.0
22.47	27.03	S.D.	20.65	26.90
4.0	6.0	Skewness	1.0	6.0
1.29	1.5	$S.D._{sk}$	1.36	1.80

which occur in many jobs. The second test, Turning, requires dexterous fingers, and good coordination of the two hands working together. A right-handed person finds the first and third rows easier, a left-handed person the second and fourth rows, and some people seem to work in either direction with about equal ease.

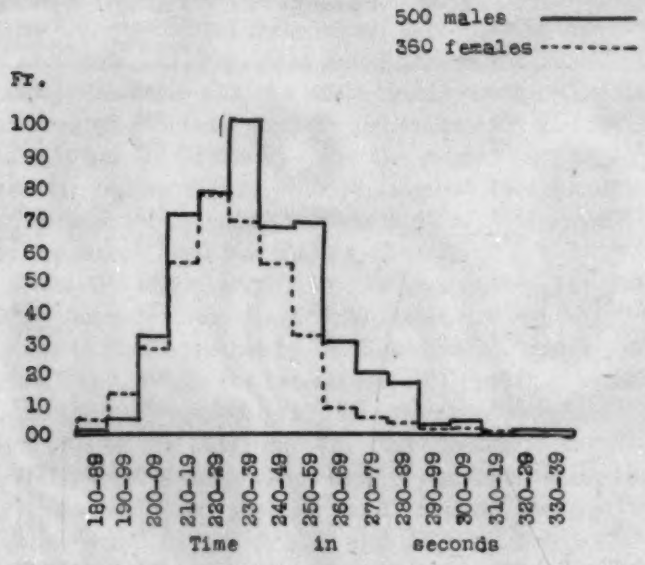


FIG. 4. Distribution of performance time on Placing test.

Norms for Placing and Turning which were developed at the Cincinnati Employment Center are presented in Table 6. The distributions on which these norms are based are shown in Figures 4 and 5. The difference between the means for men and for women on each test is about twice its standard deviation. This is not a significant difference. This agrees with the report of the Educational Test Bureau that the norms are practically identical for both sexes. Skewness is less for these tests than for any others in the battery. For males the measure of skewness is barely over three times its standard deviation

for both tests. For females the skewness is insignificant for Placing and barely significant for Turning.

Comparison with norms published by the Educational Test Bureau and furnished with the standard equipment for the test reveals certain points of difference. The Cincinnati norms for Turning show a tendency for both sexes to perform more rapidly at all levels on the board used at the Center. This is not surprising in view of the looser fit of those blocks. On

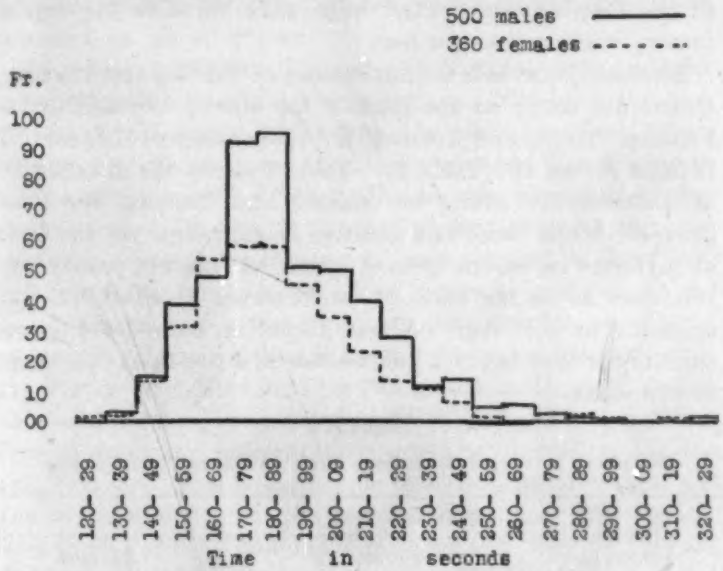


FIG. 5. Distribution of performance time on Turning test.

the Placing test also, women performed more rapidly on the Cincinnati board throughout most of the distribution. Though the more loosely fitting blocks might lead to the expectation of more rapid performance, yet men's records at the Center were slower throughout the range than those indicated by the norms of the Educational Test Bureau.

The meaning of this difference is difficult to interpret without further investigation, especially as Spatial Relations rec-

ords for both sexes at the Employment Center were more rapid than would be expected from other published norms. It may be that the Placing test, as given with the loosely fitting blocks, was too easy to challenge the best effort of the men. It was recognized that many men were difficult to motivate in this test because they thought the colored blocks were children's toys. The task in Turning was more difficult and seemed to challenge their interest more effectively. These tests, as used at the Employment Center, were more valuable for women factory workers than for men.

Some subjects made similar ratings on Placing and Turning. Others did better on one than on the other. The correlation between Placing and Turning for 230 males was .73; for 171 females it was .65 (Table 9). Table 7 shows the distribution of difference in rating on Placing and Turning for these groups. While there is a positive relationship, yet the level of performance on one type of operation does not justify any inference as to the level of performance attained by that applicant on the other. A fast worker on a one-hand operation may or may not be a fast worker on a two-hand operation, or vice versa.

TABLE 7

Difference in Percentile Ratings Made on Placing and Turning

Diff. in percentile	230 males		171 females	
	Number	Per cent of total	Number	Per cent of total
0– 9	95	41.5	61	35.7
10–19	68	29.0	45	26.4
20–29	38	17.0	28	16.4
30–39	18	8.0	19	11.0
40–49	6	2.5	12	7.0
50–	5	2.0	6	3.5

For females, the correlations between Placing and Turning on the one hand and Spatial Relations or Kent-Shakow simple problems on the other are similar, all falling between .30 and

.36, while the correlations with the Kent-Shakow complicated problems are very low, falling below .10 (Table 9). For males, however, the correlations group themselves differently. Placing and Turning correlate .42 and .44 respectively with Spatial Relations, while the correlation with simple and complicated problems of the Kent-Shakow test is .29 and .23 respectively for Placing, and .38 and .32 for Turning. All the relationships are sufficiently low to indicate that Placing and Turning measure abilities that are quite different from those measured by the other tests.

For many applicants Placing and Turning are not good tests with which to introduce the battery. The blocks used at the Center were green and orange. It might have been better had they been painted gray and black or tan and brown, or some other neutral colors. If an applicant who considers colored blocks beneath his dignity is asked to perform with them an operation as simple as Placing, he may respond by dawdling, and ignore the urge to speed. This should be guarded against by presenting first a test which suggests genuine assembling operations. After learning to respect such tests, he approaches the Placing and Turning operations with a desire to do his best, and perhaps some relief at finding the task easy. One type of applicant, however, may safely be started on Placing and Turning. This is the female industrial worker whose job has usually been a simple routine operation. She usually tries to do her best, however simple the task may be, and she feels at ease immediately if she is started on Placing and Turning, more so than if started on any other task in the battery.

Cincinnati Plier Dexterity Test as a Measuring Instrument.

Norms for this test which were developed at the Employment Center are presented in Table 8. The sex difference, which is significant in the first half of the test, becomes insignificant in the last half. This suggests that the practice afforded by the first half of the test may be sufficient to overcome any initial

handicap arising from unfamiliarity with the tool used in the test.

Distributions on which the norms are based are shown in Figure 6. Since both curves are similar in appearance, only those for the second half are shown. The measure of skewness of each distribution is approximately six times its standard deviation, indicating skewness to a significant degree.

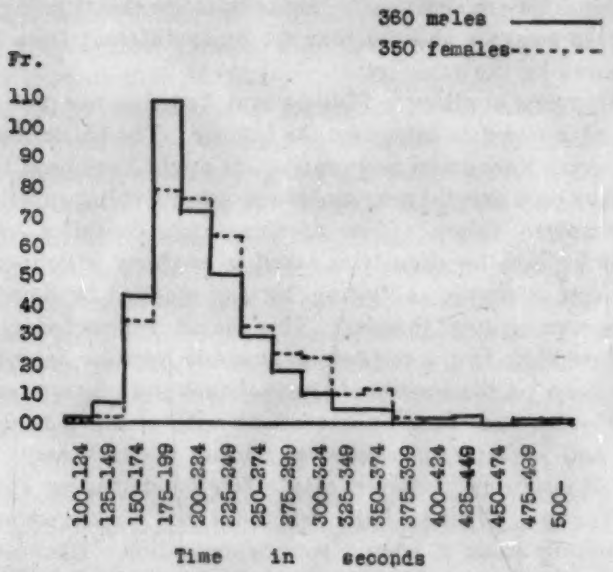


FIG. 6. Distribution of performance time on second half of Plier Dexterity test.

The correlation between the two halves of the test is .76 for men and .74 for women (Table 9). This is similar to the correlation found between Placing and Turning, and between the two parts of the Kent-Shakow test. Plier Dexterity shows sufficiently low correlation with other tests in the battery to indicate that it measures a distinct ability. The second half of the test, which is probably more valuable than the first half, has its closest correlation with Turning, which is .58 for men and .45 for women (Table 9).

The Plier Dexterity test, like the O'Connor Tweezer Dexterity test from which it was adapted, and the O'Conner Finger Dexterity test, is useful in selecting workers for jobs

TABLE 8

CINCINNATI PLIER DEXTERITY TEST

Percentile Distribution of Time Required for Completion of First and Second Halves

Males (360 cases)		Percentile	Females (350 cases)	
1st half (Time in seconds)	2d half (Time in seconds)		1st half (Time in seconds)	2d half (Time in seconds)
100	100	100	125	100
160	160	95	176	162
177	168	90	191	172
184	174	85	201	182
190	179	80	208	187
196	185	75	214	192
201	190	70	221	197
207	193	65	226	203
213	196	60	232	209
218	200	55	238	215
223	204	50	244	221
229	209	45	250	226
236	215	40	258	232
243	222	35	267	240
251	230	30	279	248
258	239	25	291	259
270	249	20	305	274
287	258	15	323	289
304	281	10	357	309
331	312	05	394	338
500+	500+	00	500+	500+
233.50	217.00	Mean	260.17	224.50
55.75	53.00	S.D.	67.25	55.5
17.5	20.5	Skewness	30.0	19.5
3.52	3.13	$S.D._{sk}$	4.53	3.73

which require the handling of small parts with great exactness. Many who perform large movements rapidly do poorly at fine movements; and many who move slowly in large movements are so exact in their neuromuscular control that they can excel at work requiring fine movements.

TABLE 9

INTERCORRELATION TABLE

Males at Upper Right and Females at Lower Left Side of Table

Test		Kent-Shakow		Spatial Rel.	Placing	Turning	Plier Dexterity	
		Simple	Compl.				I	II
K–S	N		600	150	140	140	160	160
Simple	r		.72	.78	.29	.38	.34	.32
K–S	N	500		150	140	140	140	140
Complex	r	.71		.56	.23	.32	.41	.40
Spatial	N	87	87		180	180	160	160
Relat.	r	.67	.48		.42	.44	.44	.44
Placing	N	100	100	150		230	150	150
	r	.34	.03	.32		.73	.47	.47
Turning	N	100	100	150	171		150	150
	r	.30	.06	.35	.65		.46	.56
Plier	N	92	92	146	150	150		150
I	r	.32	.12	.42	.45	.54		.76
Plier	N	92	92	146	150	150	150	
II	r	.31	.18	.28	.31	.45	.74	

FACTORS APPARENT IN TEST PERFORMANCE

Throughout the discussions references have been made to different abilities or factors in manipulative or mechanical work which the tests seemed to measure. No test in the battery used at the Employment Center involves all these factors, nor is any factor involved in all the tests. Table 10 lists the various factors which, according to our observation of many performances, seem to be measured by one or more of the tests, and the tests in which they appear.

The first five factors listed are self explanatory. They refer to the rapidity or accuracy of work with certain groups of muscles. Two hand coordination also requires no definition. It is the only factor listed which appears in but one test of the battery.

TABLE 10

Factors in Manipulative or Mechanical Work and Tests in Which They Appear

	Kent-Shakow		Manipulation		Spatial	Plier
	Simple	Complex	Placing	Turning	Relations	Dext.
1. Rapidity of movement	x		x	x		
2. Accuracy of movement			x			x
3. Hand and arm movement			x			
4. Wrist or finger movement				x		x
5. One hand operation			x			x
6. Two hand coordination				x		
7. Reaction to varied details	x	x			x	
8. Spontaneous organization of response	x	x			x	
9. Ability to follow instruction			x	x	x	x
10. Resourcefulness	x	x				
11. Poise under frustration	x	x				
12. Response to repetitive routine			x	x	x	x
13. Insight into spatial relations	x	x			x	
14. Insight into mechanical movement						

Factors 7–14 refer to characteristics or qualities of response which are more closely related to what we conceive as general intelligence or as emotional response.

Reaction to varied details may range from the type of response in which the subject reacts to general size or general shape irrespective of details of shape or position, to the response in which the subject quickly and accurately selects the proper block for the hole to be fitted.

Organization of response varies from random, unsystematic reactions to the type of response which indicates analysis and organization of the problem and of the subject's response to it.

Factor 9 refers to ability to bear in mind and to follow the verbal instructions given for the test without deviating from them.

Resourcefulness is the ability to vary or modify methods used, to abandon unsuccessful methods and to recognize and follow successful ones.

Poise under frustration refers to the quality of emotional response to a problem which appears too dfficult to be readily solved. Response to repetitive routine, also, may have an emotional quality, especially when the subject is bored with simple repetition.

Insight into spatial relations seems related to factcr number 7, reaction to varied details, yet not identical with it. This factor refers to relations between different positions of the same shape and to relations between different shapes. A subject may be quick at fitting single shapes into the holes which match them, but may have difficulty in perceiving that different shapes may be reversed, rotated, or fitted together in such a way as to make another shape which is desired.

Insight into mechanical movement does not appear as a factor in any test in the battery. It may be an element in mechanical aptitude, or perhaps an acquired skill rather than an aptitude. It may be that when we have better tests for insight into mechanical movement we shall be able to measure more effectively certain types of mechanical aptitude or ability.

SUMMARY

1. A battery of manipulative tests was given at the Cincinnati Employment Center to applicants for manipulative jobs. The battery included the Kent-Shakow industrial form board, Minnesota Spatial Relations test, Minnesota Rate of Manipulation test, and Cincinnati Plier Dexterity test.

2. Percentile norms were developed for each test, based upon the performance of young adult white males and females between the ages of 16 and 25 years. Tables of norms are given for the tests used.

3. Sex difference for the more complicated tasks of the Kent-Shakow test was significant, but for the simple tasks the sex difference was not significant.

4. The sex difference was not significant for Spatial Relations, nor for either Placing or Turning in the Minnesota Rate Manipulation test, nor for the last half of the Plier Dexterity test, though the first part of the Plier test did show a significant difference.

5. All distributions were significantly skewed toward the slow end of the scale, with the exception of the distribution of women on the Placing test. Other distributions for Placing and Turning were skewed to an extent that was only barely significant.

6. Intercorrelations of the separate tasks of the Kent-Shakow test suggest a way of shortening that test which, however, has not yet been used.

7. Intercorrelations between the tests of the battery indicate that the tests measure different abilities or groups of abilities. Abilities which may be observed in the performance are listed and discussed.

8. The use and application of each test is discussed in relation to the problem of testing adults for manipulative and mechanical abilities.

THE PURDUE INDUSTRIAL TRAINING CLASSIFICATION TEST[1]

C. H. LAWSHE, JR.

Division of Education and Applied Psychology, Purdue University

PURPOSE

THE Industrial Training Classification Test is designed to aid in selecting those persons who are most likely to profit from an industrial training program. It is designed to evaluate an individual's ability to read simple measurements and solve simple arithmetical problems involving whole numbers, fractions, decimals, and the conversion of decimals to common fractions. These simple but basic skills are essential to success in many trade schools and industrial training programs. Combined with tests of manipulative dexterity, spatial relations, and understanding of mechanical principles it possesses high predictive significance for school, industrial, and war production training programs.

CONSTRUCTION

The test was originally designed to aid in the selection of applicants for admission to an 11th and 12th grade unit-trade school. When further investigations indicated that such a test might be useful in the selection and classification of adult trainees, particularly on the pre-employment level, it was adapted to apply in this broader area.

In determining the content of the test, an evaluation of three shop mathematics textbooks[2] was made and a list of 26 "Appli-

[1] Published by Science Research Associates, 1700 Prairie Avenue, Chicago, Illinois.

[2] Johnson, *Applied Mathematics*, Bruce Publishing Company, 1939. Slade and Margolis, *Mathematics for Technical and Vocational Schools*, John Wiley & Sons. Norris and Smith, *Shop Arithmetic*, McGraw-Hill Book Company, 1924.

cations of Basic Mathematical Operations" was prepared. This list of operations was submitted to instructors in six trade areas in a trade school with the suggestion that they eliminate from the list any operation which they did not feel was necessary to individuals working or ready to begin work in their specific trades. This list of operations was then checked against detailed trade analyses prepared by the same instructors as further insurance against including operations which were not common to all the trade areas.

After the list of basic operations was prepared, the following criteria for the development of items were set up:

1. Items must involve pictorial representation whenever applicable, preference being given to working drawings (or portions thereof) of simple mechanical objects.
2. Each item shall be of an appropriate level of difficulty to sample adequately the knowledge of individuals composing the group with which the tests will be used.

The original items were prepared in parts, each of which revolved about a particular drawing. The parts were then administered to small samples of trade school boys in order that each item might be scrutinized further for ambiguity and error.

All the units were then assembled into Forms X and Y of the test. Form X was administered to 90 WPA and unemployed trainees and Form Y was administered to 214 WPA and unemployed trainees. Because the tests were long and the level of accomplishment of these particular groups was low, the time factor was not carefully controlled and not all the testees attempted all the problems. However, it was possible to determine an approximate level of difficulty for each item. From the results of these groups it was also determined that some of the items based on certain of the original basic operations were too difficult for the adult group. For this reason and also because of the time involved, 12 of the original basic operations which had been sampled were eliminated. The resulting list of operations, which was utilized in Forms A and B, is presented in Table 1.

TABLE 1

Applications of Basic Mathematical Operations Sampled in Forms "A" and "B" of the Test

Operations	Number of items in each form
1. Reading a rule to $\frac{1}{4}$ inch	1
2. Reading a rule to $\frac{1}{16}$ inch	1
3. Reading a rule to $\frac{1}{32}$ inch	1
4. Addition of whole numbers	2
5. Subtraction of whole numbers	2
6. Multiplication of whole numbers	2
7. Division of whole numbers	1
8. Reduction of fractions	2
9. Addition of fractions and mixed numbers of different denominations	3
10. Addition of decimals	2
11. Subtraction of decimals	2
12. Multiplication of decimals	1
13. Division of decimals	2
14. Conversion of decimals to common fractions	1

Following this preliminary selection of items, Form Z was assembled. This form contained only those units made up of items within the appropriate range of difficulty for the adult group. Form Z was then administered to 57 high school sophomore boys applying for admission to the trade school and to 103 students who had been in the trade school at least half a semester. The percentage of students in each group passing each item was computed, and on the basis of these data, together with the percentage data of the adult groups mentioned previously, items were allocated to Forms A and B in terms of level of difficulty as well as in terms of mathematical operations involved in the items.

As mentioned previously, the applicant group and the trade school group were pooled. The 25 per cent making the highest scores and the 25 per cent making the lowest scores were segregated and Cook's index (B) of item validity was applied. In only 4 of the 46 items did this ratio fall below 1.5 and the

ratios ranged as high as 13.3. This is sufficient evidence to indicate that each of the items retained has adequate discriminative value.

Each form (A and B) of the tests has twenty-three items. The two forms are identical and each contains four parts, each of which is based upon a simple drawing. Part I consists of three problems which sample the testees' ability to read a scale. Part II (see Fig. 1 for the drawing and item number 5 of Form B) contains five items dealing with the addition and reduction of fractions. Part III is composed of seven items involving simple operations with whole numbers. Part IV is made up of eight items involving the use of decimals.

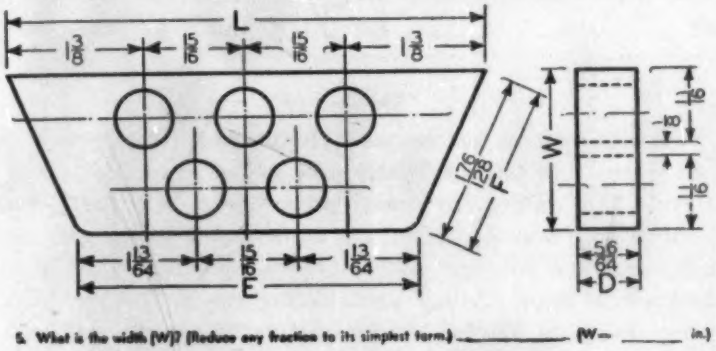


FIG. 1. A drawing and one of the accompanying items from the Industrial Training Classification Test (Form B, Part II).

RELIABILITY

Reliability coefficients for the test, as determined by correlating scores on Form A with scores on Form B, have varied from .73 to .94, depending upon the range of ability within the groups tested and are shown in the last column of Table 2. The maximum r of .94 was obtained with the residence center NYA group, which embraced a wide range of ability, while the lowest r, .73, was obtained with a group of trade school applicants which was more homogeneous due to previous selection. The coefficient of reliability for 195 cases considered as a single

group is .83. When greater accuracy of measurement is desired, both forms of the test may be given. This procedure results in a test with a reliability of .91 according to the Spearman-Brown formula.

TABLE 2

Reliability and Comparability of Forms

Group	N	Mean		S.D.		r_{AB}
		A	B	A	B	
First semester trade school boys	92	14.2	14.7	7.1	6.8	.92
NYA boys	46	15.5	16.1	7.8	7.5	.94
Trade school applicants	57	13.7	13.8	4.3	3.8	.73
All	195	14.0	14.4	6.4	5.6	.83

VALIDITY

Validity data on the test were obtained by a comparison of test scores with teachers' ratings of probable vocational success of 279 trainees in vocational programs. In one War Production Training Center 119 adult trainees who took the test were rated by their instructors on a graphic rating scale designed to measure their probable success on the job. The group was then divided into the upper twenty-five per cent, the middle fifty per cent and the lowest twenty-five per cent according to ratings (see Fig. 2, Group I). The mean test scores were found to be 18.0, 14.5, and 10.7 respectively. The difference of 7.3 between the extreme groups is statistically significant in that it is 4.6 times its standard error.

Each of 116 students in an NYA industrial training center were rated by their instructor as to probable job success by means of a rank order procedure. The Industrial Training Classification Test was administered and the trainees were categorized on the basis of ratings as were those in the previous group. Mean test scores were computed and found to be 11.5, 7.6, and 5.5 respectively (see Fig. 2, Group II). The difference of 6.0 between the high and low groups is significant since it is 4.0 times its standard error.

A procedure identical to that applied to the second group was applied to the third group of 44 NYA Resident Center boys who were enrolled in an Industrial Training program. Here the mean test scores were found to be 17.9, 13.8, and 11.6 respectively (see Fig. 2, Group III). Because of the small number of cases, however, the critical ratio was not computed.

Administration and Scoring. The test is self-administering and directions are printed on the face of the test. The time limit has been liberally set at 35 minutes because a power test

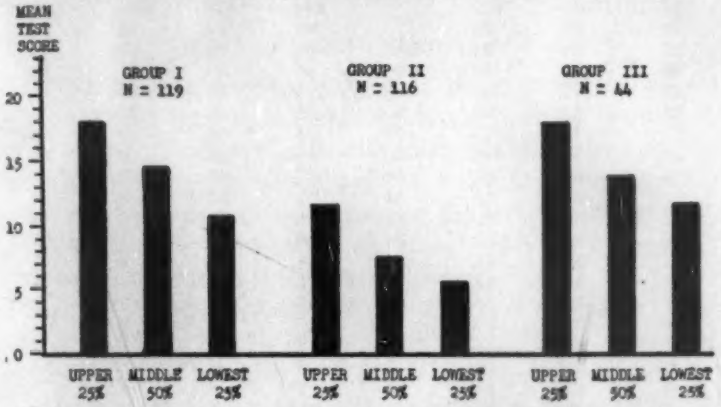


FIG. 2. Mean scores on the Industrial Training Classification Test of the upper, middle, and lowest rated divisions of each of three different groups of trainees.

and not a speed test was desired. The time limit is more than adequate and it may be found desirable to shorten it for specific groups. The score is the number of items correctly answered.

Norms and Interpretation. Preliminary percentile norms for the interpretation of scores are presented in Table 3.

The group designated as NYA trainees in Table 3 is composed of one group from an NYA residence center and one group from an NYA work center. The War Production Trainees were all adults enrolled in the so-called "No. 1 Preemployment Program" in a number of vocational training

TABLE 3

Percentile Norms for the Industrial Training Classification Test
(Forms A or B)

Score	NYA trainees N = 184	War production trainees N = 453	Trade school applicants N = 89	High school sophomores N = 163	Navy trainees N = 811	Trade school students N = 89	Navy teacher trainees N = 100
23	100	100		100	100	100	100
22	98	98		98	97	95	91
21	94	94	100	94	90	88	74
20	92	89	96	87	80	77	64
19	86	83	90	78	71	65	47
18	81	78	80	68	62	53	37
17	75	75	72	58	54	42	32
16	70	71	62	48	47	32	28
15	66	67	52	38	41	23	17
14	61	62	44	31	35	16	12
13	58	60	37	26	30	12	9
12	57	53	30	20	24	8	6
11	50	47	24	18	20	6	5
10	46	43	18	16	18	4	4
9	42	40	14	13	14	3	
8	39	37	10	10	12	2	
7	36	34	6	8	10	1	2
6	32	30	3	6	8		
5	28	26	1	5	6		
4	25	21		4	4		
3	20	16		2	3		
2	16	11		1	2		
1	9	5			1		1
0	4	2			0		

centers. The Trade School applicants were high school sophomores seeking admission to a unit-trade preparatory school. The High School Sophomores consisted of the entire tenth grade male population of an industrial city of about 40,000. The group designated as Navy Trainees was composed of enlisted men who were entering an electrician's mate training program. The Trade School Students had each been enrolled in a unit trade preparatory school for one half of a semester or more. The Navy Teacher Trainees were enrolled in a Navy teachers training course. All norms in Table 3 are based on male populations.

A STUDY OF SOCIAL BACKGROUND AND ART APTITUDE OF SUPERIOR NEGRO CHILDREN*

ALBERT SIDNEY BECKHAM

Bureau of Child Study, Chicago Board of Education

INTRODUCTION

THERE is a growing interest in the appreciation of art and art tendencies, both within and without the school-room. Industry and educators are interested in the artistic appeal. The school-room is becoming more streamlined with emphasis on eye-appeal, or the love of the beautiful. Art slogans are present on all sides, "Art in Industry," "Color in the Home," "Beauty Conquers," etc.

Modern studies reveal that art develops character. The person who lives the law of design and who is deeply interested in the beautiful is apt to have a well developed character.

For the last decade or so, psychology has made rapid advancement in the measurement of art aptitude. Some of these tests give the youngsters a genuine delight. Most of the 300 pupils in this study appeared to have been anxious to take the art tests. Much interest and enthusiasm were expressed by many of the pupils, particularly in having their art profiles explained to them.

THE PROBLEM

The problem was to compare the art performance of three groups of youngsters. The first, a group of 100 intellectually

* Appreciation and thanks are hereby expressed to Dr. Grace Munson, Director of the Bureau of Child Study, and to Mr. C. C. Willard, Principal of DuSable High School, for their interest and material help in this study. The writer is also indebted to Mr. W. A. Smith, Miss Marjorie Johnson, and Miss Dorothy Mallory for administering, scoring and checking much of the test results.

very superior children. The second was 100 children who were specializing in art or who have had several courses in art. The third was 100 youngsters picked at random from the four high school grades.

The problem was to study and compare the art abilities of these three groups according to intelligence, also grade distribution, age distribution, sex distribution and according to economic social status.

THE PROCEDURE

The art abilities of 100 intellectually superior Negro children were investigated. The intellectually superior were found in several elementary and high schools in the city of Chicago. The 100 superior children were compared with 100 children in the four high school grades who have had several courses in art at the DuSable High School. Many of them were considered quite superior in art work. Then, the 100 intellectually superior children and the 100 art pupils were compared with 100 pupils picked at random from the four high school grades of the DuSable High School in Chicago.

The test used as a basis for our comparison was "Tests in Fundamental Abilities of Visual Art," by Alfred S. Lewerenz.[1] This test is in three parts, and is designed for grades 3 to 12. There are nine specific test items that constitute a profile from very inferior to very superior.

The test items are:

1. Recognition of Proportion
2. Originality of Line Drawing
3. Observation of Light and Shade
4. Knowledge of Subject Matter
5. Visual Memory of Proportion
6. Analysis of Cylindrical Perspective
7. Analysis of Parallel Perspective
8. Analysis of Angular Perspective
9. Recognition of Color

[1] Tests in Fundamental Abilities of Visual Art may be obtained from the California Test Bureau, 3636 Beverly Boulevard, Los Angeles, California.

The intelligence test used was the New Stanford Binet Test, Form L.

RESULTS

Intelligence.[2] The intelligence of the three groups is presented in Table 1. A deal of comparative information such as vocabulary development, memory span, and reasoning was also obtained. However, we shall limit our statements in this paper to the intelligence scores.

TABLE 1

Mean IQ's, Number, Standard Deviation, and Range of Three Groups

	Total average IQ's	Intellectually superior IQ's	Art IQ's	Random sampling IQ's
Number	100	100	100	100
Mean IQ	108.5	133.2	97.5	94.9
σ	9.09	2.56	11.09	13.63
Range	64	59	64	69

The mean IQ of the intellectually superior group was 133.2 with a range of 59 and a standard deviation of 2.56. The mean IQ for the random sampling group was 94.9 with a range of 69 and a standard deviation of 13.63. The mean IQ for the art group was 97.5, the range was 64 and the standard deviation was 11.09.

Both the art and random sampling groups were average in intelligence, while the bright group has every member with a classification of very superior and above.

GRADE DISTRIBUTION IN ART SCORES

In the recognition of proportion, there was no significant difference between the superior, the art and random sampling groups. In the originality of line drawing, the intellectually superior and art groups scored higher than the random

[2] *Measuring Intelligence*, Terman and Merrill. Test booklets, cards, and materials from Houghton Mifflin Co., publishers, New York.

sampling group. The odds were slightly in favor of the art group.

For the observation of light and shade, the intellectually superior group was decidedly superior at each grade level.

The knowledge of art subject matter revealed that the total average for all grades was about the same.

In the study of visual memory of proportion we observe a gradual increase as each grade is reached according to total average results.

There was practically no grade difference in any of the groups in the analysis of cylindrical perspective, the analysis of parallel perspective and in the analysis of angular perspective.

For recognition of color the total average of the 10th grade exceeded the total average of the 9th, 11th, and 12th grades.

AGE DISTRIBUTION IN ART SCORES

The age range was from 9 to 20. The intellectually superior group had 4 and 7 per cent, respectively, at ages 11 and 12. Age was practically no factor in the recognition of proportion with the superior, the art, and the random sampling groups. The age distribution for the art group was from 13 to 19 and from 13 to 20 for the random sampling group.

Let us next consider the originality of line drawing. We note here that there was a gradual improvement in scores as age increased with the superior group. With the art and random sampling groups age was not a factor in line drawing.

In the observation of light and shade age was not a factor for any of the three groups.

For the knowledge of art subject matter age was a dominant factor with the superior group. There was no observable age difference with the art and random sampling groups. Age difference was also observed in the visual memory of proportion, particularly with the superior group. Very little difference was observed in visual memory with the art and random sampling groups.

There was practically no age difference in the analysis of cylindrical perspective with the intellectually superior, the art, and random sampling groups. In the analysis of parallel perspective there was apparently no age difference with the intellectually superior and random sampling groups. The art group reveals that age is a factor especially in the late teens.

In the analysis of angular perspective the average scores were almost constant with all ages from 11 to 20 with the intellectually superior and with the art group. Age differences appeared with the random sampling group. The better scores were obtained in this study group by the older children.

In the study of the recognition of color a number of age differences appeared. With the intellectually superior group the older youth were better than the younger in the recognition of color. This is reversed with the art group, where the younger pupils (from 13 to 17) were definitely better than those over 17 years of age. The young children also made higher scores in recognition of colors with the random sampling group.

SEX DIFFERENCE IN ART SCORES

The boys of the superior, the art, and the random sampling groups were better than the girls in the recognition of proportion. The intellectually superior boys and intellectually superior girls were equal in the originality of line drawing. The same sex difference appeared in the random sampling group. The boys of the art group surpassed the girls of the art group in all phases of line drawing.

Sex differences were revealed in the observation of light and shade. In this particular, the intellectually superior boys showed an unusual superiority. The boys of the art group were also superior to the girls of the art group but the girls in the random sampling group were better in average scores than the boys of that group. It is noteworthy to state that the girls in the random sampling group scored higher than the girls in the art group.

The intellectually superior girls and boys were about the

same in their knowledge of the subject matter of art. This group was superior to the random sampling group and the art group. There was practically no sex difference in the two latter groups.

No sex difference appeared with the intellectually superior and random sampling groups in visual memory of proportion. The boys of the art group scored much higher than the girls of that group in visual memory.

There was no sex difference in any of the three groups in analyzing the cylinder.

The intellectually superior girls were better than the boys in the analysis of parallel perspective. In the art group, the boys were slightly better than the girls. There was no sex difference in parallel perspective in the random sampling group.

What about analysis of angular perspective? Here we find the intellectually superior boys about twice as good as the intellectually superior girls. Likewise, in the art group the boys were better than the girls. Practically no sex difference appeared in the random sampling group.

Were there sex differences in the recognition of color? The answer is "Yes." The intellectually superior girls were decidedly better than the intellectually superior boys. The boys of the art group surpassed the girls of the art group. Average scores for the boys and girls were the same in the random sampling groups. It is noteworthy that the girls of the superior group were higher than the average for all groups combined, in the recognition of color.

ART SCORES ACCORDING TO ECONOMIC SOCIAL STATUS

The economic social status of these youngsters was determined by the Taussig Scale. Group One represents the children of day-laborers. Group Two includes semi-skilled laborers where a small degree of training has been obtained. Group Three has children of skilled workers. In Group Four we find children of semi-professional parents while Group Five comprises the children of professional parents.

With the intellectually superior the art and random sampling groups, it is revealed that economic social status was of little or no consequence in the recognition of proportion.

In the originality of line drawing we note a gradual increase in average score from Group One to Five with the intellectually superior children. Economic-social status does not appear to be a factor with the art and random sampling groups in this particular. For the observation of light and shade we note that the children of laborers or Group One make the highest average. Children of professional parents rank second.

Economic-social status was a very small factor in the knowledge of subject matter.

In visual memory of proportion, Group Five, or children of professional parents, made the highest average scores.

Economic-social status was no observable factor in the analysis of cylindrical perspective. In the analysis of parallel perspective the children of professional parents made the lowest average scores. The intellectually superior children were better in test results in this particular than those of the art and random sampling groups. In the analysis of angular perspective the youth in Group Five made the highest average scores. The art and random sampling groups were the same in total average scores.

In the recognition of color, Group Two, or the children of semi-skilled laborers, received the highest score. The lowest average scores were made by the children of professional parents. The art and random sampling groups received about the same average scores.

SUMMARY

Intelligence was an important factor in many of the art test items. About half of the test items revealed no grade differences between the three groups. In the other test items the intellectually superior group scored higher except in the observation of light and shade and the originality of line drawing. In these phases of art the higher scores and the more pleasing eye-appeal were obtained by the art group.

Many of the test items revealed no age differences. A few, however, revealed significant differences such as the art group in the late teens where a spurt appears in the analysis of parallel perspective.

Sex differences are weighted somewhat in favor of the boys. The girls were superior in two important test items, while the boys showed a superiority in four.

It is noteworthy that the boys surpassed the girls in all phases of line drawing. It is equally significant to reveal that the girls of the superior group were higher than all groups combined in the recognition and placing of primary colors.

The importance of social-economic status is minimized when we observe that the children of laborers achieve the highest scores about as often as those of semi-professional and professional parents.

BIBLIOGRAPHY

ANTHONY, EDWARD. We build a personality. *School Arts*, vol. 40, p. 183.

BAKER, GRACE M. An enterprise in art appreciation with college students. *Education*, vol. 60, p. 162.

BINGHAM, WALTER. *Aptitudes and Aptitude Testing.* New York: Harper Bros. 1937. 205 p.

FAULKNER, RAY. *Art in Life and School*, vol. 39, April, 1940.

HAWLEY, CECELIA. Broadening our conceptions of art education. *Education*, vol. 60, p. 134.

HIGHTOWER, KATYE. The relation of a school arts program to home improvement. *School Arts*, p. 70, Oct., 1939.

MAXWELL, SARAH. Character education through a love for the beautiful. *School Arts*, vol. 40, p. 58.

PERRINE, VAN DEARING. Creative development of the child. *School Arts*, vol. 39, p. 291, May, 1940.

THE EFFECT OF SPECIALIZED INDUSTRIAL NORMS ON THE USE OF THE MINNESOTA RATE OF MANIPULATION TEST AS A SELECTIVE INSTRUMENT IN EMPLOYMENT PROCEDURE

DAVID W. COOK AND MARGUERITE F. BARRE

RESULTS obtained from the administration of the Minnesota Rate of Manipulation Test to the general population, as reported in the University of Minnesota study, have yielded norms which are useful within a limited scope. When the test was employed as a selective instrument in a large manufacturing company located in the New York metropolitan area, where its validity was established, it was found that the performance of the applicants of this locale was so superior that the Minnesota norms were not applicable.

After a study, plant norms were established which indicated that this test was valuable for selection only in so far as the *type of group* on which the norms have been set, and the *conditions* under which the test was standardized, are known.

In 1931 the Employment Stabilization Research Institute conducted by the University of Minnesota was responsible for the development and standardization of several tests which were designed to measure various skills and abilities which had been found to be basic and necessary for good performance on several types of jobs. Many of these tests, the Minnesota Clerical, the Minnesota Spatial Relations Form Board, and the Minnesota Rate of Manipulation, for example, have been used successfully in selecting people on the basis of their possessing these specific skills for jobs which have been analyzed and have been found to be dependent upon these same skills.

Since the process of selection is one of sorting or separating

the good from the poor performer it necessarily is based on some system of comparison. One such means of comparing the performance of an individual on a test with the performance of others on the same test is the "percentile table." By consulting such a table it is possible to determine at once where the score of one person falls in relation to the scores of the group and to express his rating in terms of a "percentage." This figure reveals what per cent of the total group has scored higher or lower than the individual.

The percentile table is an exceedingly useful instrument in industrial selection, for if the test has been standardized and validated on a given occupation or family of occupations in a particular plant it can be used as a gauge by which the general labor market can be measured. By arranging a table of norms and setting a critical score the percentile table can be efficiently employed to select applicants who can do as well as those already on the job or as well as the general population with whom they are vying. Such a careful selection will eliminate many "poor bets," will reduce job misplacements or failures, and will result in a general saving of time, effort, and money.

A knowledge of the type of group on which the percentiles are based determines to a large degree the usefulness of the table. For example, it would obviously be unfair to compare a 10-year-old child's score with the scores made by a group of adults on a certain test. Consequently it is extremely important for those using tests as instruments of comparison or selection to know what kind of a group the percentiles are based upon, otherwise wide differences in rank can occur.

One of the tests developed and used at the Employment Stabilization Research Institute mentioned above is the Minnesota Rate of Manipulation Test which was designed to predict the rate at which a person is likely to perform manual manipulations. There are two parts to the test, both measuring speed. Part I—Placing—measures "the probable speed at which an individual can do things with his hands"; Part II—Turning—measures "speed in doing things with the

fingers." The test was standardized on a group of about 5,000 men and women employed in a wide variety of occupations and on the basis of their scores a table of percentiles was drawn up. It is these norms which are commonly in use.

The plant at which this study was made has been using the Minnesota Rate of Manipulation Test for a number of years and has found it to be a very useful instrument for jobs requiring manipulative skill. However, its effectiveness in selecting has been brought about through a very careful use of percentiles. When the test was first used the scores of applicants were compared with the percentile tables on the group used in the original standardization study. By inspection it was noted that the scores of applicants were, as a group, far superior to those reported by the author of the test. As soon as a large number of cases had been collected, as a result of a routine testing procedure, percentile tables were computed. The plant is located in an area in which there are many manufacturing industries and these percentiles were based on the performance of the population from which the company normally draws its applicants. The group included 2,475 applicants ranging in age from 18 to 25 in approximately the following proportion:

Age (Men and Women)	*Percentage*
18–20	75
21–23	15
24–25	10

The new norms for this test might be properly designated "industrial" because of their being developed in a manufacturing organization on a population interested in and often experienced in work requiring manipulative skill. Such norms should render the test more useful than otherwise might be possible to any *industry* using it as an instrument for the better selection of bench hands, assemblers, and other workers of this type. The following table shows the new "Industrial" norms for both men and women. For purposes of comparison,

MINNESOTA RATE OF MANIPULATION TEST

Placing

Minnesota norms — Men and women — N = 5000

Time in seconds	Percentile rank	Time in seconds	Percentile rank	Time in seconds	Percentile rank	Time in seconds	Percentile rank
153	99	195	94	236	45	278	2
154	99	196	94	238	42	279	2
156	99	198	93	239	39	281	2
158	99	199	92	241	37	283	1
159	99	201	91	243	34	284	1
161	99	203	90	244	32	286	1
163	99	204	89	246	29	287	1
164	99	206	87	247	27	289	.9
166	99	207	86	249	25	291	.7
167	99	209	84	251	23	292	.6
169	99	211	83	252	21	294	.5
171	99	212	81	254	19	295	.4
172	99	214	79	255	17	297	.3
174	99	215	77	257	16	299	.29
175	99	217	75	259	14	300	.23
177	99	219	73	260	13	302	.19
179	98	220	71	262	11	303	.15
180	98	222	68	263	10	305	.12
182	98	223	66	265	9	307	.10
183	98	225	63	267	8	308	.08
185	97	227	61	268	7	310	.06
187	97	228	58	270	6	311	.05
188	97	230	55	271	5	313	.04
190	96	231	53	273	4		
191	96	233	50	275	3		
193	95	235	47	276	3		

Industrial norms (as of August 1941)

Men — N = 468				Women — N = 2007			
Time in seconds	Percentile rank	Time in seconds	Percentile rank	Time in seconds	Percentile rank	Time in seconds	Percentile rank
0–179	100	216–217	44	0–153	100	210–211	43
180–181	99	218–219	39	154–167	99	212–213	38
182–183	98	220–221	34	168–175	98	214–215	33
184–187	97	222–223	31	176–179	97	216–217	28
188–189	96	224–225	27	180–181	96	218–219	24
190–191	95	226–227	23	182–183	94	220–221	20
192–193	94	228–229	18	184–185	93	222–223	17
194–195	92	230–231	14	186–187	91	224–225	14
196–197	90	232–233	12	188–189	90	226–227	11
198–199	87	234–235	10	190–191	87	228–229	9
200–201	84	236–237	9	192–193	84	230–231	7
202–203	82	238–239	7	194–195	80	232–233	6
204–205	77	240–241	6	196–197	77	234–235	5
206–207	72	242–243	4	198–199	72	236–239	4
208–209	68	244–245	3	200–201	67	240–241	3
210–211	63	246–249	2	202–203	63	242–245	2
212–213	55	252–261	1	204–205	57	246–247	1
214–215	50	262——	0	206–207	53	248——	0
				208–209	48		

the norms supplied by Minnesota are arranged beside them. It will be seen that the differences between the groups is great enough to make a difference of as much as 40% in the percentile rank of an individual. For example, a girl scoring 233" on Placing Test (Part I) would be located at the 50%ile, or average, on the Minnesota norms but only at the 6th percentile on the "Industrial" norms.

The tests were administered by well-qualified examiners, simultaneously to groups of 3 to 8, as part of the normal preemployment testing program.

In order to make a complete and meaningful comparison between the Industrial groups of men and women and the Minnesota group the distributions were subjected to certain statistical procedures to find the mean scores, the differences between the several mean scores, and the reliability of the difference between these mean scores. The Minnesota study reported that the distributions of scores were practically identical for men and women; however the Industrial scores revealed a sufficiently significant difference between the scores of men and women on the Placing Test (Part I) to warrant a separate table of percentiles. The Turning Test (Part II) did not yield such a difference.

In the case of both the Minnesota and Industrial studies the norms were based on general population but it can readily be seen that to use Minnesota norms on Industrial applicants or vice versa would be to get a false impression of the applicant's ability. It may be that the differences found are due to the strong incentives present in the case of the applicant, for he was striving to do his best in order to excel and qualify for a job; it may be that inasmuch as the test was administered in groups the spirit of competition with his neighbor spurred him on to work at an unusually fast rate. Be that as it may, a great difference has been found to exist and therefore any company using this test should find it helpful to know the conditions under which the standardization was made.

It can thus be seen that the use of norms is valuable as a

MINNESOTA RATE OF MANIPULATION TEST
Turning

Minnesota norms — Men and women — N = 5000

Time in seconds	Percentile rank	Time in seconds	Percentile rank	Time in seconds	Percentile rank	Time in seconds	Percentile rank
108	99	152	94	195	45	239	2
110	99	153	94	197	42	241	2
111	99	155	93	199	39	242	2
113	99	157	92	200	37	244	1
115	99	158	91	202	34	246	1
116	99	160	90	204	32	247	1
118	99	162	89	205	29	249	1
120	99	163	87	207	27	251	.9
121	99	165	86	209	25	252	.7
123	99	167	84	210	23	254	.6
125	99	168	83	212	21	256	.5
126	99	170	81	214	19	258	.4
128	99	172	79	216	17	259	.3
130	99	174	77	217	16	261	.29
132	99	175	75	219	14	263	.23
133	99	177	73	221	13	264	.19
135	98	179	71	222	11	266	.15
137	98	180	68	224	10	268	.12
138	98	182	66	226	9	269	.10
140	98	184	63	227	8	271	.08
142	97	185	61	229	7	273	.06
143	97	187	58	231	6	274	.05
145	97	189	55	232	5	276	.04
147	96	190	53	234	4		
148	96	192	50	236	3		
150	95	194	47	237	3		

Industrial norms (as of August 1941) — Men and women — N = 2475

Time in seconds	Percentile rank	Time in seconds	Percentile rank	Time in seconds	Percentile rank	Time in seconds	Percentile rank
130	100	151	81	167	38	184	13
131	99	152	79	168	36	185	12
132–134	99	153	76	169	34	186	11
135–137	98	154	74	170	31	187–188	10
138–139	97	155	71	171	27	189–190	9
140	96	156	69	172–173	26	191–192	8
141	95	157	66	174	24	193–195	7
142	94	158	63	175	23	196–198	6
143	93	159	60	176	22	199–200	5
144	92	160	58	177	21	201–205	4
145	91	161	55	178	19	206–210	3
146	90	162	52	179	18	211–217	2
147	88	163	49	180	17	218–219	1
148	87	164	46	181	16	220–and up	
149	85	165	44	182	15		
150	83	166	41	183	14		

MINNESOTA RATE OF MANIPULATION TEST

PART I—PLACING

University of Minnesota norms	Industrial norms	
Men and women (1) N = 5000	Men (2) N = 468	Women (3) N = 2007
Average score* 233	214	208
Probable error of average .2262	.4622	.2232

Difference between averages		Probable error of difference	$\frac{D}{PE_{diff.}}$ †
(1) and (2)	19	.514	36.96
(1) and (3)	25	.317	78.86
(2) and (3)	6	.513	11.69

PART II—TURNING

University of Minnesota norms	Industrial norms	
Men and women (1) N = 5000	Men (2) N = 504	Women (3) N = 2030
Average score* 192	164	164
Probable error of average .2404	.4454	.2330

Difference between averages		Probable error of difference	$\frac{D}{PE_{diff.}}$ †
(1) and (2)	28	.5059	55.34
(1) and (3)	28	.3345	87.70
(2) and (3)	0	.5099	0

* Score is time in seconds based on the sum of four trials.

† Since a $\frac{D}{PE_{diff.}}$ of 4 indicates complete reliability, it follows that the obtained difference is not only completely reliable but is much larger than it need be in order to insure a true difference greater than zero.

measuring rod for selection in industry but only in so far as the type of group on which the norms have been set and the conditions under which the test was standardized are known.

This account should in no way discredit or detract from the value of the test or Minnesota norms. On the contrary, it

should increase its value for industry or for any other agency using it for a specialized industrial purpose. It was for this reason, only, that it was considered advisable to report these findings.

These percentiles are being used at present. However, a check on the effectiveness of these norms for purposes of selection is highly desirable. With this in view, additional scores are being obtained in the same manner and when a sufficient number of cases has been collected they will be reviewed and published for the benefit of industrial users of this test.

THE USE OF THE STRONG VOCATIONAL INTEREST BLANK AND THE PRESSEY SENIOR CLASSIFICATION TEST IN THE SELECTION OF CASUALTY INSURANCE AGENTS

EDWIN E. GHISELLI
University of California

ALTHOUGH there have been a number of investigations dealing with the usefulness of tests in the selection of employees in the various sales occupations, very little attention has been devoted to their application in the case of casualty insurance agents. Results obtained by Bills[1] indicate that a combination of the ratings on the Strong Vocational Interest Blank of life insurance and real estate salesmen gives a good prediction of success in the selling of casualty insurance. The present paper is a report of an attempt to verify Bills' findings and to discover the usefulness of an intelligence test.

METHODS AND PROCEDURES

The subjects considered in the present investigation are twenty-nine agents working in the Pacific coast area of a casualty insurance company. Since in addition to the actual selling of policies the agents were expected to render certain services to the company and to policy holders, production would be inadequate as the sole measure of their success. Consequently, ratings were obtained from the sales manager on four scales, namely, effort to obtain new accounts and to renew

[1] M. A. Bills, "Relation of Scores in Strong's Interest Analysis Blanks to Success in Selling Casualty Insurance," *J. Appl. Psychol.*, 1938, 22, 97–104; "Selection of Casualty and Life Insurance Agents," *J. Appl. Psychol.*, 1941, 25, 6–10.

expiring policies, and willingness to render services to the policy holders and to the company. It was impossible to obtain ratings from two or more persons who were acquainted with the activities of the salesmen in order to gauge the reliability of the ratings. However, in addition to his ratings on the four major aspects of the work, the sales manager rated the men on an over-all scale of general value to the organization. The coefficient of correlation between the total of the specific ratings and the over-all ratings was .85.

Two variables which might be expected to affect the dependability of production figures are amount of experience on the job and type of area in which the agent works (city, small town, farm). Both of these factors were found to have been operating. The average production of agents having between one and two years experience was 52 per cent greater than the production of those who had under one year experience, and the average production of agents with over two years experience was 88 per cent greater. By expressing each agent's production as a ratio of the average production expected for a man with his particular amount of experience, a correction for this variable was effected. The average production (corrected for experience) of agents operating in farm districts was 36 per cent greater than that of those operating in small towns, and that of men operating in cities was 18 per cent less. To correct for this variable, each agent's production was expressed as a ratio of the average of men working in his particular type of area. The reliability of the corrected production figures, as indicated by the coefficient of correlation between records for the current and previous years, was found to be .73. The coefficient of correlation between the sum of the ratings on all scales and uncorrected production figures was .40, and with corrected production .49. In order to obtain a criterion of over-all proficiency on the job, the total ratings and production index were equally weighted and combined into a single measure.

In addition to the Strong Vocational Interest Blank, it was

decided to study the effectiveness of an intelligence test. It was felt that the latter might be useful in measuring those aspects of the job not directly involved in selling, such as making adjustments and rendering similar services to the company and to its clients. The Pressey Senior Classification test was selected as the intelligence test because norms are available for the adult employed population.[2]

RESULTS

The coefficients of correlation between scores on the various tests and measures of proficiency on the job are given in Table 1. With the Strong Interest Scales, the coefficients are with the standard scores rather than with the letter ratings of degree of interest. It will be observed that none of the validity coefficients are particularly high. The highest coefficient is between ratings on the CPA scale and the over-all measure of proficiency. This coefficient with a value of .38 is too low for use in selection. The best predictions are given by the Pressey test and interest ratings on CPA and occupational level. Ratings of interests of real estate salesmen, and the various group interests, yield coefficients which are insignificantly different from zero.

It might be that although the degree of similarity of interests with any one occupational group is not greatly related to the proficiency of the casualty insurance agents, breadth of interests might be. This would appear to be a reasonable hypothesis inasmuch as the agents are called upon to deal with people in many walks of life. The two indices of breadth of interests which were used were the sum of the standard scores on all interest groups, and the number of groups with ratings of B or better. The coefficients of correlation between each of these indices and the criteria of proficiency are given in Table 2. However, neither of these indices of breadth of interest yielded satisfactory correlations with the criteria.

[2] H. J. Green *et al.*, *A Manual of Selected Occupational Tests.* Bull. Employ. Stabil. Res. Inst. Univ. of Minn., 1933, 2, no. 3.

The mean score of the casualty insurance agents on the Pressey test fell at the 80th percentile of norms for the adult employed population. The percentages of agents making ratings of A, B, and C on the various scales of the Strong Blank which were studied are shown in Table 3. It will be observed that the agents tend to earn high ratings on occupational level, real estate and life insurance salesmen, and on groups V, VIII, and IX. Group V has to do with occupations involving personal contact, group VIII office work, and group

TABLE 1

Coefficients of Correlation between Test Scores and the Various Criteria of Job Proficiency

Test	Ratings	Production	Ratings & Production
Pressey Classification	.29	.26	.32
Strong Interest Scales			
CPA	.30	.35	.38
Life Insurance	.22	−.01	.12
Real Estate	.06	−.19	−.08
Occupational Level	.31	.15	.27
Group I	.11	−.02	.05
Group II	.00	.17	.10
Group V	.11	.09	.12
Group VIII	.12	.00	.07
Group IX	.07	.05	.07
Group X	−.17	−.02	−.11

IX sales. In other words, the casualty insurance agents score high on just those scales on which they might be expected to make high scores. When workers on a given job earn higher scores on a test than a group of unselected individuals, it is generally taken to mean that the traits and abilities measured by the test are important for successful performance of that job. If this conclusion be correct, then scores on the test should show a significant correlation with measures of proficiency on the job.

Reference to Table 1 will show that ratings on the Strong Vocational Interest Scales, with the exception of occupational level and CPA, bear little or no relationship to the criteria of proficiency. This fact cannot be explained on the basis of unreliable criteria, since the reliability coefficients are sufficiently high to permit much higher validity coefficients, and are about the magnitude which is generally found for such

TABLE 2

Coefficients of Correlation between Indices of Breadth of Interests and the Various Criteria of Job Proficiency

	Ratings	Production	Ratings & Production
Sum of standard scores on all groups	.18	−.07	.06
No. of groups with rating of B or better	.24	.16	.23

TABLE 3

Percentages of Agents Earning Various Ratings on the Strong Vocational Interest Scales

	Real estate	Life insurance	CPA	Occupational level	I	II	V	VIII	IX	X
A	34%	28%	0%	86%	0%	3%	31%	24%	59%	3%
B	62	66	21	14	52	21	59	69	38	62
C	4	7	79	0	48	76	10	7	3	0

jobs. Neither can the range of talent be the determining factor, since ratings of proficiency varied from the lowest possible rating to the highest, while in production the index of the best agent was 950 per cent higher than that of the poorest one. The distribution of interest ratings on the various scales of the Strong Blank are satisfactory. As a matter of fact, the highest validity coefficients were obtained with the CPA and occupational scales which have the narrowest range of scores.

CONCLUSIONS

The findings of the present investigation that ratings of life insurance and real estate salesmen on the Strong Vocational Interest Blank were unrelated to measures of proficiency of casualty insurance agents are at variance with those of Bills. While the discrepant results may be attributed to the relatively small number of cases employed in the present study, it seems that in part, at least, they may be explained on the basis of differences between the jobs. The mere fact that they have the same job titles does not necessarily mean that the work involved is the same. The types of contracts written by the various casualty insurance companies show some differences, and general policies among the companies vary. How important these factors are cannot be decided on the basis of the available information.

The fact that the agents as a group make high scores on certain of the interest scales which are unrelated to proficiency on the job suggests that individuals with a particular pattern of interests seek work in certain fields rather than in others, regardless of whether those interests are related to success on the job. In other words, persons employed on a particular job may be outstanding in certain characteristics, although those characteristics are not important in the work. The United States Employment Service has reported a number of instances where workers on various jobs obtained high scores on several tests despite the fact that the scores bore little or no relationship to success.[3] This means, then, that the validity of a test is not necessarily demonstrated by the fact that a given group of workers earn higher scores on it than would be expected on the part of a random sample of the population.

SUMMARY

The Strong Vocational Interest Blank and the Pressey Classification test were administered to twenty-nine casualty

[3] W. H. Stead *et al.*, *Occupational Counseling Techniques.* American Book Co., N. Y., 1940.

insurance agents. Only interest ratings on CPA and occupational level, and scores on the Pressey test showed appreciable correlations with measures of proficiency on the job. The agents made high scores on those interest scales concerned with occupations involving personal contact, office work, and sales, but the indication was that these characteristics were not important for successful performance of the job.

THE GENESIS OF BRAND AWARENESS[1]

L. P. GUEST
The Pennsylvania State College

INTRODUCTION

IN the course of our daily lives many of us exhibit definite preferences for one thing or another but rarely analyze the reasons which prompt our choices. Many of these preferences have been inculcated very early in life and have served as definite but unrecognized predetermining influences for our present choices. Recognition that early childhood conditionings may exert a strong influence in determining later preferences led to the formulation of the present study.

The relative lack of empirical evidence concerning the whole field of brand preference strongly suggested the necessity for a study of the genesis and constancy of brand preference. Preliminary observations had not gone far before it became apparent that a significant study of brand *preference* could not be conducted without a coordinate study of brand *awareness.* It was imperative to determine the extent of brand awareness in order to distinguish between choices made in the absence of actual knowledge of the brands in question and those made in the light of knowledge. Actually the data on the extent of brand awareness have considerable importance in their own right. Therefore, a research program was designed to gather evidence pertinent to brand awareness and brand preference constancy. This paper will present the results of the study of brand awareness, and a further paper will discuss the results found with respect to brand loyalty.

[1] This study formed a part of a Ph.D. thesis conducted while the author was in residence at the University of Maryland.

PROCEDURE

The subjects in the experiment were 813 pupils drawn from three grade schools and one high school in Prince George's County, Maryland. Between 76 and 105 students were tested in each grade. The schools were chosen in order to obtain a representative sample of economic groups; comparison of the ratios in the present sample with another independent estimate for the approximate area showed good agreement. Data concerning age, grade, sex, home address, and the number of siblings for each student were obtained from the subjects themselves, while IQ and father's occupation were obtained from school records. Economic status was estimated from father's occupation and general home surroundings.

An awareness test consisting of a series of 70 brand names of commercial products and 10 other words which could be considered brand names was used to collect the data. The 80 names were capable of being classified into 16 product categories, with 5 names in each category. There were 5 names for each of the following:—*coffee, gasoline, cereal, radio, typewriter, watch, razor, tire, gum, bread, tooth paste, magazine, soap, automobile, department store,* and *political parties.*

In the case of *products,* an attempt was made to select a wide variety of articles so that any differences in brand awareness for different kinds of products that might occur would be clearly defined. The *brands* chosen were selected because they were well known and could be regarded as representative of the product in question.

The test was constructed by placing the 80 brands in chance order in a multiple choice form with five possible responses and a "Don't Know" category for each brand. The subject was to indicate which of five products was correctly associated with the brand.

For example, the item for the brand Texaco was as follows:

Texaco Coffee Automobile Tire Gasoline Store Don't Know

The position of the correct response was randomized from

brand to brand. The directions for taking the test together with four sample problems preceded the test proper.

The test was pre-tested several times both with individual subjects and groups, and appropriate revisions were made in the light of difficulties and misinterpretations encountered in the pre-tests. Two measures of reliability were obtained. Sixty-seven students in grades 3–8 took the test three days apart. Test re-test r's were as follows:—total number right, .90; total number wrong, .83; and total number Don't Know, .92. It was also important to know whether the same response for each item was being given, since the study of brand loyalty compared brand preference with correctness of response. Therefore, the tests were scored for absolute agreement of answers between first and second testing and showed an average of 83.6 per cent agreement.

All tests were administered to the subjects by the experimenter and two trained assistants. The tests were given to groups in the school classroom during the first school hour in the morning and efforts were made to minimize boredom. The tests were conducted in grades 3–11 (7-year grade school, 4-year high school in the county) in ascending order. In order to minimize language difficulties, the test was read aloud to children in grades 3–5. In the higher grades, except for instructions and examples, the children completed the task without reading assistance unless requested. All subjects were instructed not to guess but to indicate "Don't Know" if they really didn't know. All tests were administered under standard conditions and with favorable cooperation on the part of the students.

RESULTS

It was necessary to establish a criterion of what has been referred to as brand awareness. The important consideration for the study of brand awareness was not whether a given brand for a product was better known than other brands for the *same* product, but whether all the brands for a product tended to be better known than those for *other* products. The

probability of guessing 4 out of 5 brands correctly by chance alone is 1 in 725 and this was arbitrarily selected as the criterion of brand awareness for a particular product. If a child got 4 or more brands for a product right it was considered that he was familiar with brands for that product.

Relationship between Age and Brand Knowledge. The Chi Square Test of significance was applied by comparing the distribution of students knowing the brands with the distribution of those not knowing the brands from age to age for each product. The Chi Square Test allows one to estimate the probability that obtained differences can be attributed to random errors of sampling.

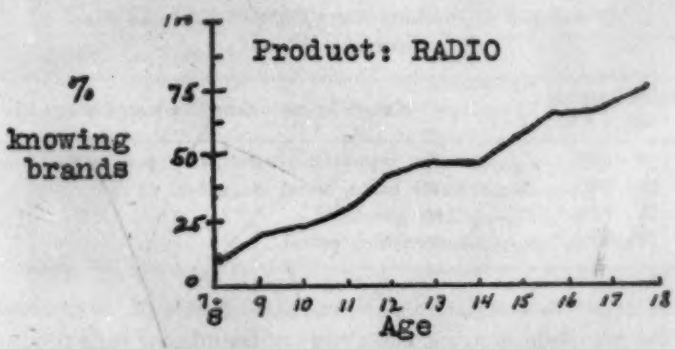


FIG. 1. Per cent of boys knowing brands of radios at each age level.

For example, if age were not a factor in brand knowledge one would expect that there would be no difference between the number of subjects knowing the brands from age to age. When the obtained Chi Square limited the probability that obtained differences could arise less than 1 in 100 times due to random errors of sampling, this difference was considered to be highly significant, and when the Chi Square limited the probability to less than 5 chances in 100 that the difference could arise due to sampling errors the difference was considered moderately significant.[2] Figure 1 illustrates the dis-

[2] The reader is cautioned to distinguish between statistical significance and psychological significance.

tribution of the per cent of boys knowing brands for the product *radio*.

The differences in the number knowing the brands from age to age for all products except *cereal* were found to be highly significant. Since over 90 per cent of the subjects knew the brands for *cereal* even at ages 7 and 8 we might expect that significant differences would not occur. The general trend with slight variations was for all curves (plotted for percentage of each age group aware) to rise. This means that, in general, children become more familiar with brand names as they grow older.

TABLE 1

Tabulation of Products According to Initial and Final Awareness Status

Initial status (age 7 & 8)	Known by more than 75 per cent at age 18
0– 25%	Radio, typewriter, watch, tire, gum, coffee, bread
26– 50%	Tooth paste, store, magazine, politics
51– 75%	Soap, gasoline
76–100%	Automobile, cereal

In order to compare inter-product differences, comparison of the per cents showing knowledge of brands for each product was made. This was done by comparing the youngest and oldest age groups of students for each product. Thus, the percentage showing knowledge of brands for a product was compared with all other products for the 7- and 8-year-old group (combined due to few cases aged 7) and the 18-year-old group. Four steps were used in this comparison, 0–25%, 26–50%, 51–75%, and 76–100% of the subjects showing knowledge. For example, reference to Figure 1 shows that for *radio*, 12 per cent of the students at ages 7 and 8 were aware of brand names for that product, and 83 per cent of the students at age 18 were aware of the same brand names. According to the classificatory scheme used this product would be classified under Initial Status as 0–25 per cent, and as known

by 76 per cent or more at age 18. Table 1 presents the results obtained from this comparison.

All of the products' brands were known by more than 75 per cent of the 18-year-old group except for the brands of *razor*, but are known by widely varying percentages of the 7- and 8-year-old group. Thus, brands of *soap* and *gasoline* are known by many children even at ages 7 and 8 whereas brands

TABLE 2

Tabulation of Products According to Age at Which 76% or More Showed Brand Familiarity

Age at which 76% knew brands	Product
7 and 8	Cereal
	Automobile
8½	Gasoline
9	Soap
11	Politics
	Magazine
11½	Store
	Tooth paste
	Bread
14	Coffee
15	Gum
15½	Tire
16	Watch
	Typewriter
18	Radio
Never	Razor

of *coffee* and *typewriter* are known by relatively few children at 7 and 8. In other words, although the brands for all the products listed in Table 1 are ultimately known by 76 per cent or more of the subjects, the number of children initially showing brand knowledge for various products varies from very few to very many. Brands for the product *razor* (not listed in Table 1) seem to constitute a special case since they were not well known at early ages (less than 25 per cent) and never

were known by more than 50 per cent at any one age level within the age range studied.

Another analysis that can be made with profit is one which compares the products according to the age level at which 76 per cent or more of the subjects knew the brands for each product (76 per cent is a convenient, if arbitrary, critical level). The results of this comparison are shown in Table 2.

A comparison of this table with the previous table shows that the same rank order of products is maintained and furnishes some measure of the consistency of results. The rank order and the corresponding ages may be interpreted, then, as a rough index of the ages at which brand knowledge for each of the products concerned arises and the order of the development of brand familiarity for the products.

The Relationship between Economic Status and Brand Knowledge. The sample was divided into the conventional A, B, C, and D economic groups; subject's economic status being estimated from father's occupation and general home location according to criteria developed by the Psychological Corporation. The results indicate that, in general, there is greater brand familiarity as one goes from the D to the A economic group. The Chi Square test was again employed to determine whether the observed differences between the distributions of those who knew and did not know brands for each economic group could be explained as a result of random errors of sampling. There were more than 99 chances in 100 that the obtained differences for the brands of the products *typewriter, watch, magazine, coffee, tire, gum, politics, tooth paste,* and *store* were not due to sampling errors, and more than 95 chances in 100 that the differences in the case of the brands of the products *bread* and *gasoline* were not a result of the same kind of errors. The differences between those displaying knowledge and those who did not for the brands of the products *cereal, soap, automobile, radio,* and *razor* could be explained by random errors of sampling.

Since the differences between the top three economic groups

were smaller than those between the lowest group and the others, an analysis of the significance of the differences between those showing familiarity and those not showing familiarity for each economic group was undertaken. This comparison showed that 10 of the 16 products yielded a significant difference for the D economic group alone, most of the variance in the total distributions being located in that group. This indicates that members of the top three economic groups show little differences in brand knowledge, whereas there is a disproportionate number of the lowest economic group lacking brand knowledge as compared with the other three groups. In other words, children in the D economic group are not as familiar with brand names as members in the A, B, and C groups.

The Relationship between IQ and Brand Awareness. The question of the relationship between IQ, and brand awareness was determined by grouping the subjects according to IQ and comparing the distributions of those indicating brand knowledge with those not indicating such knowledge. The general trend of the distributions of those aware of brand names was toward a higher percentage of awareness until a maximum was reached, followed by a slight decline. The maximum was reached at different IQ levels for different products. The fact that 10 of the 16 curves followed this trend lends credence to a hypothesis that there may be a maximum IQ score above which brand knowledge declines but proof of this depends upon further research.

The differences between the distributions of IQ's for those showing knowledge and those not showing knowledge for each product were all highly significant except those for *soap* and *razor*. The lower IQ groups contributed most heavily to the total variance. This indicates that fewer members of the lower IQ groups had knowledge of brand names than those in the upper IQ groups.

Relationship between the Number of Siblings in the Family and Brand Knowledge. Since brothers and sisters might talk

over brand names and discuss preferences between themselves and therefore brand names receive more consideration among larger families than smaller families an analysis was made of awareness as a function of the number of siblings in the family. Since only one of the differences was found to be significant, however, further computations were disregarded and we may say that the number of siblings in the family bears little or no relationship to brand knowledge.

CONCLUSIONS

On the basis of the results presented and in the light of the conditions of the experiment, the following conclusions may be drawn: For the particular brands and products studied:

1. Awareness of brand names as defined and measured increased with increasing age.
2. Awareness of the brands for different products began and reached a maximum at different age levels. Brands for some products were known at very early age levels, while brands for other products were not known until a later age.
3. The lowest economic group was not as familiar with brand names as the top three groups.
4. Children with low IQ's were less familiar with brand names than those with higher IQ's.
5. With one exception, brand awareness bore no relationship to the number of siblings in the family.

THE PERFORMANCE OF ADULT MALES ON THE MINNESOTA PAPER FORM BOARD TEST AND THE O'ROURKE MECHANICAL APTITUDE TEST

BERT HANMAN

WPA Education Program, California State Department of Education

AS an aid in selecting men for national defense training classes, the WPA Education Program of Northern California has been administering mechanical tests to WPA workers in the San Francisco Bay Area since June, 1941. The Minnesota Paper Form Board Test, Series AA, and the O'Rourke Mechanical Aptitude Test, Form C, were the two mechanical tests used. As a consequence of this testing, it is doubtful that the published norms of the Revised Minnesota Paper Form Board Test are typical of adult males.

Both tests were given to a total of 785 men, in groups of 20–25, at one two-hour sitting, allowing time for rest periods. Their ages ranged from 20–65 years, tending to cluster around 39–43, and their education from no formal schooling to the equivalent of a Ph.D. degree, clustering around 8–9 years of schooling.

The computed percentile scores for the present study are shown in Table 1, while the published norms for the two tests may be compared with those of the present study in Table 2.

Since the obtained distribution corresponds well to the norms of the O'Rourke Mechanical Aptitude Test based on 70,000 cases, it appears that the present sample of 785 adult males is adequate and also that the caliber of the men is comparable. With this equivalence and with the compared norms for the Minnesota test not corresponding, a question arises as to the adequacy of the published norms for the Revised Minne-

TABLE 1

Percentile Scores for 785 Adult Males on the Minnesota Paper Form Board Test and the O'Rourke Mechanical Aptitude Test

Percentile rank	Scores on Minnesota Paper Form Board Test (Possible score: 64)	Scores on O'Rourke Mechanical Aptitude Test (Possible score: 342)
99	53	331
95	45	304
90	40	280
85	38	268
80	36	252
75	34	240
70	33	230
65	31	221
60	28	208
55	26	198
50	24	188
45	23	176
40	21	165
35	20	152
30	18	139
25	15	127
20	13	112
15	10	97
10	7	78
5	3	53
1	0	11

TABLE 2

Comparison of the Published Norms for Adult Males with the Norms for the Present Study on the Minnesota Paper Form Board Test and the O'Rourke Mechanical Aptitude Test

	Minnesota Paper Form Board Test (Possible score: 64)		O'Rourke Mechanical Aptitude Test (Possible score: 342)	
	Published norms	Present study	Published norms	Present study
Q 3	36	34	241.5	240.0
Median	31	24	189.5	188.0
Q 1	23	15	137.0	127.0
Number of cases	76	785	70,000	785

sota Paper Form Board Test. This may be due in part to the small size of the Minnesota sample as well as to its poor representation of adult males. On the other hand, it is conceivable that both O'Rourke's population and the present one are inferior to unselected males of this age range.

A COMPARISON OF CERTAIN VISUAL FACTORS WITH THE EFFICIENCY OF TEXTILE INSPECTORS

ARTHUR W. AYERS
American Viscose Corporation

OF all experimentation in the realm of psycho-physiology, that having to do with vision seems to occupy the major portion of literature. In spite of this interest in the various aspects of seeing, there appears to be a dearth of information regarding the role of certain visual factors in occupational proficiency. Stolley (15), in testing aptitude for dressmaking; Drabs (7), working with sorters and thread-tiers in the artificial silk industry; Christiaens (6), in an attempt to pre-select "autogenic solderers"; and Tiffin and Greenly (16), in selecting electrical fixture and radio assemblers, have used vision test batteries with varying degrees of success. Vogel (17) has stressed the industrial importance of correcting visual deficiency and further established its significance as a research problem.

The incidence of visual deficiency in various industrial groups encountered in the writer's work on standardization of the Visual Sensation and Perception Tests (4, 5) proposed a rather tenable thesis that visual factors in industrial efficiency might be studied if an occupation involving critical patterns of vision would serve as a basis for evaluation. And, further, that a minimum of other psychological factors be concerned with proficiency in the particular job. The textile inspection operation, described later, seemed to satisfy these criteria. Only the objectives of the study remained to be formulated and they developed in the following order.

1. To discover if inspectors manifesting visual deficiencies:
   a. are deficient in quantity of production
   b. are deficient in quality of production
   c. show evidence of attempt to compensate by some measurable job performance
   d. exhibit characteristics which complicate the job routine
2. To discover if inspectors having little or no deficiency are:
   a. satisfactory or superior in quantity of production
   b. satisfactory or superior in quality of production
3. To discover if visual factors vary in their influence upon different phases of job performance.

B. EXPERIMENTAL SET-UP AND PROCEDURE

The entire group of forty-five female operators, engaged in the final inspection of cones of rayon yarn, was selected for this study.

1. *The Work Situation*

Inspectors stood at individual tables (about waist-height for the average woman) which served primarily for convenience in wrapping the cones after they were classified as first quality yarn. Units, about which the operators held some doubt, were set aside for the final decision of the foreman.

Each cone[1] was held by both hands, for the purpose of inspection, at distances varying from fourteen to eighteen inches from the eyes (depending upon individual visual habits). A light, just above the operator's head, cast 100 footcandles of illumination upon her work.

There was no wage scale incentive to production. All inspectors received the same hourly rate. In addition it was maintained that a lenient daily range of production had been worked out for this job.

[1] A large majority of cones, inspected during the experimental period, weighed three pounds. However, there were some two- and four-pound units.

2. *Selection of Criteria Inherent in the Work Situation*

The item of primary importance was to discover if any inspectors were failing to discover defective units. This was accomplished by foremen who made a daily check of ten cones classified as first quality by the inspector.[2] Results so obtained gave rise to:

Criterion I—Incidence of failure to discover defective units.

The total number of units (first quality and inferior), handled by each operator in the course of the work day, was also recorded. These data were incorporated in:

Criterion II—Average hourly production.

The foreman also kept a record of the total number of cones set aside, by each operator, for his decision; together with the number of units which he believed should not have been held for him. Resultant records serve as a basis for:

Criterion III—Incidence of units which should not have been set aside for foreman's decision.

Criterion IV—Total units set aside for foreman's decision.

Daily records embodying the criteria outlined above were obtained for each operator over a two week period. Additional data were gathered on ages of inspectors and length of time employed on this job.

3. *The Vision Test Battery and Testing Procedure*

Tests selected for this work situation were directly concerned with appraisal of functions having to do with clearness and singleness of the visual image at a point comparable to working distance.

The battery decided upon conforms to the following objectives:

a. It can be administered by clinicians having a feasible amount of training in visual instrumentation.
b. It can be used in other studies in industry.
c. The majority of visual readings are taken at a point comparable to normal working distance.

[2] No evidence was found that indicated awareness of the experimental period on the part of the inspectors.

Vision tests used in this experiment, types of readings,[3] and distances at which readings were taken are listed below.[4]

1. Diagnostic Stereopsis (Keystone Diagnostic Series), O.U., thirty inches.
2. Stereopsis (Visual Sensation and Perception Tests), O.U., sixteen inches.
3. Ametropia (Visual Sensation and Perception Tests), O.U., O.S., and O.D., sixteen inches.
4. Snellen Chart, O.U., O.S., and O.D., twenty feet.
5. Visual Acuity (Test Type Card No. 1981, American Optical Co.), O.U., O.S., and O.D., sixteen inches.
6. Plus Lens Tolerance, O.S. and O.D., sixteen inches.
7. Accommodation (Beren's Rule, American Optical Co.), O.U., O.S., and O.D.
8. Relative Visibility (Luckiesh and Moss Visibility Meter, Lighting Research Laboratory, General Electric Co.), O.U., O.S., and O.D., sixteen inches.
9. Visual Efficiency, O.U., O.S., and O.D., optical infinity (Keystone Visual Safety Tests).
10. Eye Co-ordination Level (Stereopsis), O.U., optical infinity (Keystone Visual Safety Tests).
11. Vertical Imbalance (Phoria), O.U., optical infinity (Keystone Visual Safety Tests).
12. Binocular Fusion, O.U., sixteen inches and optical infinity (Keystone Visual Safety Tests).
13. Lateral Imbalance (Phoria), O.U., sixteen inches and optical infinity (Keystone Visual Safety Tests).
14. Sharpness of Image (Ametropia), O.U., O.S., and O.D., optical infinity (Keystone Visual Safety Tests).
15. Color Vision, O.U.

Tests were administered by the writer in the dispensary of the textile plant. A constant illumination (twenty foot candles) was maintained on all test objects insofar as the physical set-up of the dispensary would allow. Subjects were tested during work hours with the prerogatives of sequence left up to management. At the conclusion of visual testing each inspector was asked:

[3] O.U. (Oculus Unati)—Both Eyes; O.S. (Oculus Sinister—Left Eye; O.D. (Oculus Dexter)—Right Eye.

[4] The reader is referred to ( ) for description and administration of Visual Sensation and Perception Tests and tests 9 to 15 inclusive.

If you were asked to estimate the amount of time you spend each day on "close work" such as reading, sewing, knitting, crocheting, etc.—that is away from the job—what would your estimate be?

Replies were noted on the visual record form.

Vision test findings were obtained on all foremen participating in the experiment.

C. RESULTS

1. *Classification of Findings*

One of the statistical procedures selected for defining the results of experimentation was the correlation technique.

TABLE 1
Classification of Vision Test Findings

Vision test	At or above the standard for this experiment	Below the standard for this experiment
Diagnostic Stereopsis	45% or more	40% or less
Near Point Stereopsis	90 or 100%	80% or less
Ametropia	11 or 12 balls	10 balls or less
Snellen Chart	20/20 O.U., O.S., O.D.	Less than 20/20
Near Point Acuity	.50D O.U., O.S., O.D.	.75D or larger type
Plus Lens Tolerance	5.5 or more diopters O.S. – O.D.	Less than 5.5 diopters O.S. – O.D.
Plus Lens Difference	Less than .5 diopters monocular difference	More than .5 diopters
Accommodation:		
Near (Blur) Point	14.0 cms. or less	More than 14.0 cms.
Far (Fade) Point	42.0 cms. or more	Less than 42.0 cms.
F.P – N.P.	28.0 cms. or more	Less than 28.0 cms.
Relative Visibility	Less than 1.80 O.U.	More than 1.80 O.U.
Visual Efficiency	100% or more O.U.	90% or less O.U.
Eye Coordination Level	90 or 100%	80% or less
Vertical Imbalance	On dot	Off dot
Binocular Fusion	3 balls	2 or 4 balls
Lateral Imbalance		
Near	4.75 plus	Less than 4.75
Far	8.25 plus	Less than 8.25
Sharpness of Image	11 or 12 balls	10 balls or less
Color Vision	15 or 16 items	14 items or less

However, the construction of several vision tests used in the study and the nature of findings on two out of four job criteria did not lend themselves to the customary product-moment method of correlation. Since the Cosine Pi Tetrachoric method is adapted to this type of data, it was decided to use this technique throughout. It is recognized that the coefficients, resulting from this method, are more eccentric than product-moment ones.[5]

TABLE 2

Classification of Job Criteria

	At or above the 45th percentile on work record	Below the 45th percentile on work record
Criterian I	No failure to identify defective units	Failure to identify one or more defective units
Criterion II	239 lbs. per hour or more	Less than 239 lbs. per hour
Criterion III	One or no cones left for foreman's decision (should not have been left for him)	Two or more cones left for foreman's decision (should not have been left for him)
Criterion IV	Leaving a total of less than sixty units for foreman's decision	Leaving a total of sixty or more cones for foreman's decision

The findings on all vision tests and job criteria were grouped into two categories, *i.e.*, "at or above the standard for this experiment" and "below the standard for this experiment."

Table 1 is a summary of the results of this classification for vision tests. This table contains the name of each test and points on the particular scale of the test which served to divide the experimental group into the categories expressed above.

Table 2 presents the classification of job criteria.

[5] The probable error of a tetrachoric correlation of zero, for the experimental group is ±.152. Henceforth when correlation coefficients are discussed it will be in terms of the number of probable errors they are removed from a zero correlation (no relationship).

2. *Relationship between Job Criteria*

When job criteria were compared by the correlation technique it was noted that a marked relationship existed among Criteria I, III, and IV. This seemed to indicate that inspectors who failed to identify defective units were not only leaving more units for the foreman's decision but also more cones which should not have been left for him. The converse was true as well.

It was further found that Criterion II bore a negative relationship to I and virtually no relationship to IV. Thus inspectors who ranked high in production showed a tendency toward failure to identify defective units and left more units for the foreman's decision than should have been left for him; and again the converse was found to be true. If Criteria I, III, and IV can be termed qualitative ones, it seemed that qualitative indexes were inversely related to the quantitative one.

Reliability coefficients were calculated by comparison of the first week's record of the experimental period, with that of the second week. They are as follows: Criterion I .732, Criterion II .846, Criterion III .827 and Criterion IV .914. All criteria are sufficiently reliable for this type of study.

3. *Relative Importance of Separate Visual Factors in Job Performance*

Table 3 is a summary of intercorrelations between vision tests and job criteria. It is repeated—a zero correlation coefficient for this group has a probable error of $\pm$ .152.

The following vision tests show intercorrelations with two or more criteria that are removed more than 2.5 probable errors from a zero "r."

1. Diagnostic Stereopsis.
2. Visual Acuity 16″ (Reading Card).
3. Accommodation.
    a. Near Blur Point.
    b. Far Fade Point.
    c. F.F.P. Minus N.B.P.

4. Vertical Phoria.
5. Lateral Phoria (Equivalent of optical infinity).
6. Binocular Fusion (16″).
7. Ametropia (16″).

TABLE 3

A Summary of Tetrachoric Intercorrelations between Vision Tests and Job Criteria

Vision tests and allied factors	Incidence of defective units as reported by foreman	Average hourly production	Incidence of units which should not have been set aside for foreman's decision	Total units set aside for foreman's decision
Diagnostic Stereopsis	.620	.239	.370	.610
Stereopsis (16″)	.233	−.077	.094	.331
Color Vision	.452	.271	.084	.347
Ametropia (16″)	.729	.092	.386	.336
Snellen Chart (20′)	.077	.413	.237	.355
Visual Acuity (16″)	.618	−.042	.591	.266
Plus Lens Tolerance	.088	.059	.038	.034
Plus Lens Difference	.332	.101	−.187	.038
Accommodation (Near Blur Point)	.512	.571	.345	−.033
Accommodation (Far Fade Point)	.416	.124	.412	.600
Accommodation (F.F.−N.B.)	.435	.296	.301	.404
Relative Visibility	.373	.184	.103	.177
Age	.248	.040	.198	−.168
Job Experience	.137	−.025	.104	.038
Extra-Job Use of Eyes	.158	−.162	.157	.182
(Betts Tests)				
Visual Efficiency	.358	−.431	.078	−.358
Stereopsis (20′)	.237	−.332	.092	.058
Vertical Phoria	−.207	.482	−.465	−.253
Fusion (20′)	.168	.327	.416	−.297
Lateral Phoria (20′)	−.005	.582	−.001	.568
Lateral Phoria (16″)	−.158	.459	.146	.222
Fusion (16″)	.416	.456	.266	.468
Ametropia (20′)	.304	−.193	−.148	.205

It will be noted that five tests (1, 2, 3b, 3c, and 6) correlate positively with two or three qualitative criteria while four tests (3a, 4, 5, and 6) show positive intercorrelation with the quantitative criterion. The later relationship is partially explained by the fact that these tests serve as indexes of individual susceptibility to ocular fatigue.

The same statistical technique (tetrachoric-correlation) was applied to find any interrelationship which might exist among vision tests.

The following relationships were discovered:

a. Diagnostic Stereopsis bears a close relationship to Ametropia. This is to be expected because a refractive error could cause a failure on both tests. Further, a lowered visual acuity could cause failure on each of the other two.
b. Visual acuity also bears relationship to the far fade point in the accommodation readings. This test measures minimum legible on a receding target.
c. Binocular fusion shows a positive relationship with vertical phoria. Vertical displacement of the visual axes inhibits the individual's ability to blend images.
d. A negative relationship exists between binocular fusion and lateral phoria. This finding seems to indicate that esophoria is more concerned with disability to fuse than is exophoria when exophoric readings do not exceed those of the experiment.

The relative importance of single visual factors is computed by determining their regression weights when used in a battery. Partial beta weights were obtained by the Doolittle Method and are presented in Table 4.

Diagnostic Stereopsis obtained maximum weighting in two test batteries; those for Criteria I and IV. Visual Acuity and Lateral Phoria received maximum weighting in Criteria II and III, respectively.

4. *Role of Vision Test Batteries in Appraising Job Proficiency*

The multiple correlation coefficients obtained through the use of test batteries (indicated in Table 4) are as follows:

Criterion I	.882
Criterion II	.813
Criterion III	.753
Criterion IV	.851

The size of the experimental group and the eccentricity of tetrachoric "r's" must be recalled when considering these multiple correlation coefficients.

Further analysis was made by comparing the number of vision tests which the operators failed with their performance as evidenced in the work criteria. Several significant results were apparent:

a. A correlation of .737 was found between the number of vision tests failed and the number of defective items which operators failed to recognize.
b. A correlation of .613 was found between the total number of units set aside for the foreman's decision and the number of vision tests failed.
c. A correlation of .699 was found to exist between the number of vision tests failed and the total number of units set aside for the foreman's decision that should not have been left for him.
d. A correlation of $-.497$ was found between average pounds of yarn inspected per hour and the number of vision tests failed.

It appears from these results that operators failing few vision tests show no tendency to fail to identify defective units, leave fewer cones for the foreman's decision, and fewer units that should not be left for his decision. On the other hand, these operators show a tendency for lower production.

Inspectors failing several vision tests show a tendency to fail to identify defective units, leave more cones for the foreman's decision, and more cones that should not be left for him. But these workers show a tendency for higher production.

Finally, the number of vision tests in which the operator stood below the standard for the group, was compared to the number of work criteria in which a low ranking was noted. This was done without weighting vision tests or criteria. Results are presented in Figure 1. It will be noted that 35.6 per cent of operators failed three or more vision tests. Of these only 6.7 per cent were above in three or more criteria. The

probable error of a fifty-fifty proportion in this group, virtually assures improbability of such a proportion in this dichotomy in repeated experimentation. Of those who were above passing standards on seven out of nine tests, 17.8 per cent were below standards on two or more criteria. It would appear that this group could profit from special attention and instruction by the supervisory personnel.

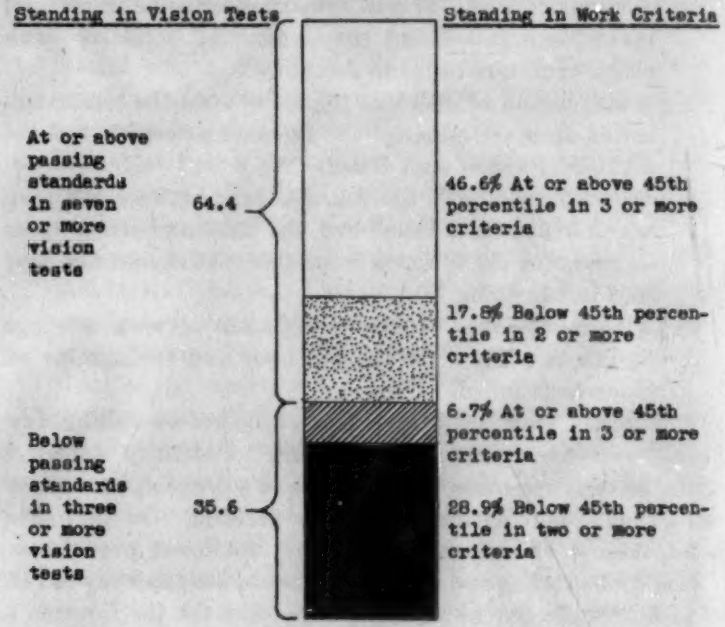

Standing in Vision Tests
Standing in Work Criteria
At or above passing standards in seven or more vision tests
64.4
46.6% At or above 45th percentile in 3 or more criteria
17.8% Below 45th percentile in 2 or more criteria
6.7% At or above 45th percentile in 3 or more criteria
Below passing standards in three or more vision tests
35.6
28.9% Below 45th percentile in two or more criteria

FIG. 1. A comparison of visual findings on nine tests with standing in work criteria.

5. *Relationship of Other Factors to Job Criteria*

Table 3 shows inter-correlation of three additional factors with work criteria: age, length of time on the inspection job and extra-job use of eyes. It may be seen that no marked relationship exists between these factors and work criteria. The significant point from these findings seems to be the lack

TABLE 4

A Summary of Regression Coefficients for Vision Tests

Vision tests	Incidence of defective units as reported by foreman	Average hourly production	Incidence of units which should not have been set aside for foreman's decision	Total units set aside for foreman's decision
Diagnostic Stereopsis	.516			.405
Ametropia 16″	.197			
Visual Acuity 16″	−.230		.610	
Accommodation Near Blue Point	.311	.518		
Accommodation Far Fade Point			.078	.279
Vertical Phoria		.209	−.369	
Binocular Fusion 16″	.437	.272		.392
Lateral Phoria 20′		.540		.228
Accommodation F.F.P − N.B.P.	.288			

of relationship between length of time on the inspection task and work criteria. The range of experience for these subjects was three months to twelve years with sufficient scatter to uncover a tendency if it were present. To the experimenter, the task seemed to include no elements in which the operator could not become proficient in a short training period.

D. SUMMARY AND CONCLUSIONS

Several incidental findings are considered to be of some importance. It appears that the qualitative criteria are inversely related to quantitative index in this task. Inspectors who failed to identify defective units were not only leaving more units for the foreman's decision and more cones which should not have been left for him, but also ranked higher in production. This group failed several of the vision tests.

Conversely, inspectors who exhibited no tendency toward failure to identify defective units were leaving fewer units for

the supervisor's decision, fewer that should not have been left for him, ranked lower in production and failed very few vision tests. All job performance criteria showed a marked degree of reliability.

Thus, it appears that operators in the former group were handling more materials in all respects. At first it would seem that the reason for their high productive rate was the failure to identify defective units, but upon analysis this was a minor quantity when compared to total units packed and those set aside for foreman's decision. It seems more tenable that higher production in this case may be a compensating device for visual deficiency. In addition, these operators offer more of a problem to supervisory personnel by reason of the number of units about which they were unable to make a decision.

Age, length of time on the job and use of eyes away from work were marked by a lack of relationship to the qualitative criteria.

Five of the vision tests, *i.e.*, diagnostic stereopsis, ametropia, visual acuity, accommodation and binocular fusion, show positive relationship to the qualitative criteria. Four tests show positive relationship to the quantitative criterion; near blur point, vertical phoria, lateral phoria, and binocular fusion.

Of these tests, diagnostic stereopsis obtained maximum regression weighting in test batteries related to Criteria I and IV. Visual acuity and lateral phoria received maximum weighting in test batteries related to II and IV respectively.

When work criteria are combined and resulting data compared to the number of vision tests failed, it was found that of 35.6 per cent who failed three or more vision tests, only 6.7 per cent were above standard in job performance.

Within the limitations of this study, nine tests of vision appear to be of value in appraising the individual's capacity to inspect textiles. The standards set up in this study have been applied to corrected as well as naked vision. Therefore, it is believed that corrections worn by the individual should enable him to meet these standards. Vision tests are listed in descending order of importance.

Diagnostic stereopsis (at the equivalent of thirty inches).	A reading of 45 per cent or better on the stereometric series.
Binocular fusion (at the equivalent of sixteen inches).	Ability to fuse the four test balls into three. (Slide DB–4.)
Accommodation: Near Blur Point. Far Fade Point. F.F.P. minus N.B.P.	A near blur point reading of less than 14.5 centimeters provided the far fade point is forty-two centimeters or greater. (Beren's Rule.)
Ametropia (sharpness of image) at the equivalent of sixteen inches.	Responding correctly to five or six test items with each eye. (Slides DB7F and DB7G.)
Visual Acuity (at the equivalent of sixteen inches).	.50D binocular and monocular vision on test type card No. 1981 or its equivalent.
Lateral Imbalance.	A reading ranging from 8.0 to 10.5 at the equivalent of optical infinity and 4.5 to 7.0 at the equivalent of sixteen inches. (Slide DB8.)
Vertical Imbalance.	Test line in contact with the dot. (Slide DB9.)

It is emphasized that readings in the last two tests not conforming to the standards of the experiment may be accepted, providing the individual does not fail to meet the standards for "passing" set up by the designer of the tests.

The scope of the study is definitely limited by reason of the following points:

a. A diagnostic visual examination such as is conducted by a licensed practitioner would undoubtedly approach factors beyond the instrumentation of this study.
b. No opportunity was offered for study of sex differences.
c. The full effect of ocular correction was not explored.

d. There is no attempt at comparison of binocular and monocular visual efficiency.

e. The size of the experimental group.

It is the writer's hope, however, that it will contribute in its modest efforts to stimulate research in a field which is deserving of more attention than it has had in the past.

BIBLIOGRAPHY

1. BERENS, C. *The Eye and Its Diseases.* Philadelphia: W. B. Saunders Co., 1937.
2. BETTS, E. A. *The Prevention and Correction of Reading Difficulties.* Evanston: Row, Peterson and Co., 1936, 323–350.
3. ————————. Visual Sensation and Perception Tests, Part I—Lateral Imbalance. Meadville: Keystone View Co., 1939.
4. ————————, AND AYERS, A. W. Visual Sensation and Perception Tests, Part II—Visual Efficiency. Meadville: Keystone View Co., 1940.
5. ————————, AND AYERS, A. W. Visual Sensation and Perception Tests, Part III—Stereopsis. Meadville: Keystone View Co., 1940.
6. CHRISTIAENS, A. G. Etude Relative au Metier de Soudeur Autogene. *Bull. Off. intercom. Orient. prof., Brux.*, 1935, 15 (38), 14.
7. DRABS, J. La Preselection Professionnelle a l'usine. Une Recherche Preliminaire dans l'industrie de la Soie Artificielle. *Travail Hum.*, 1937, 5, 257–285.
8. DUKE-ELDER, S. *The Practice of Refraction.* Philadelphia: P. Blakiston's Son & Co., 1938, 220–230.
9. GRANT, V. W. *Psychological Optics.* Chicago: The Professional Press, 1938.
10. *Keystone Diagnostic Series, Book of Stereoscopic Technique,* Sections II and V. Meadville: Keystone View Co.
11. LUCKIESH, M., AND MOSS, F. K. *The Science of Seeing.* New York: D. Van Nostrand Co., Inc., 1937.
12. PETERS, C. C., AND VAN VOORHIS, W. L. *Statistical Procedures and Their Mathematical Bases.* New York: McGraw-Hill Co., 1940.
13. SKEFFINGTON, A. M. *Differential Diagnosis in Ocular Examination.* Chicago: Wilton Co., 1931.
14. SOUTHALL, J. P. C. *Introduction to Physiological Optics.* New York: Oxford University Press, 1937.
15. STOLLEY, G. Psychotechnische Eignungsprufung der Schneiderin Prufverfahren und praktische Leistungskontrolle. *Indus. Psychotechn.*, 1927, 4, 369–379.

16. TIFFIN, J., AND GREENLY, R. J. Employee selection tests for electrical fixture assemblers and radio assemblers. *J. Appl. Psychol.*, 1939, 23, 240–263.

17. VOGEL, M. A. Eyesight surveys. *Hum. Factor* (London), 1937, 11, 394–398.

18. ZOETHOUT, W. D. *Physiological Optics.* Chicago: The Professional Press, 1927.

A COMPARISON BETWEEN JEWS AND NON-JEWS WITH RESPECT TO SEVERAL TRAITS OF PERSONALITY

ABRAHAM P. SPERLING
City College of New York

PREVIOUS STUDIES

MANY generalizations ascribing characteristic traits of personality to Jews as a group are to be found in both scientific and popular literature. Most of these are opinions based on subjective judgments. Objective studies comparing personality traits of Jewish groups with others are very few in number and rather narrow in their scope. In criticism of such subjective expressions, Garrett, in the introduction to one of the first objective studies, says:

> A few definite facts about Jews, Italians and English are more illuminating than hundreds of opinions.[1]

In this study, among other factors, Garrett compares a group of Jews and non-Jews in their results on the Laird Personal Inventory B2. He concludes that no significant differences appear at any time among the different groups on the Personal Inventory.

An earlier study cited by Rumyaneck[2] concerns an investigation conducted by Leydesdorff and reported in Dutch in Review A R G B, April, 1925. Using Heyman' and Wiersman's valuations he made a survey of emotional differences between Jews in Holland and non-Jews. He found that Jews

[1] H. E. Garrett, "Some Group Differences in Personality, Intelligence and College Achievement," *Personnel J.*, 1929, 7, 341.

[2] J. Rumyaneck, "The Comparative Psychology of Jews and Non-Jews," *Brit. J. Psychol.*, 1930–31, 21, 404–426.

are much more emotional than Gentiles and cites some of the following results:[3]

	Jews *Per cent*	*Non-Jews* *Per cent*
Emotionally inclined	63.8	52.6
Quickly offended	52.9	43.5
Good-natured	38.6	52.6
Of a critical temperament	53.4	38.4
Anxious and suspicious	41.0	30.9

In an investigation of Jewish temperament Sward and Friedman[4] employed the Bernreuter Personality Inventory and Heidbreder's questionnaire for introversion and inferiority feeling. They compared groups of Jewish and non-Jewish students at the University of Minnesota, Western Reserve University and two Pittsburgh High Schools. Their statistical treatment of the data indicate few statistically reliable differences between the groups. In their conclusions on the several groups of data, the authors make the following statements:

> As a matter of averages the Jewish scores are consistently higher in the direction of inferiority.
>
> There is a consistent though unreliable race difference in central tendency; the Jews have higher neurosis averages in all groups.
>
> In contrast to the small but consistently larger incidence of instability in all Jewish groups, the 40 Jewish offspring who figure in Table VI are less neurotic in self-attitude than their non-Jewish pairs.[5]

In an attempt to elicit patterns of Jewish temperament, Sward[6] in another article presents the results of an item analysis of 125 items on the Bernreuter. Taking percentage of Jewish responses against percentage of non-Jewish re-

[3] *Ibid.*, p. 420.

[4] K. Sward and M. Friedman, "Jewish Temperament," *J. Appl. Psychol.*, 1935, 19, 70–84.

[5] *Ibid.*, pp. 74, 77, 79.

[6] K. Sward, "Patterns of Jewish Temperament," *J. Appl. Psychol.*, 1935, 19, 410–425.

sponses, he finds significant critcal ratios of the differences. From these data Sward concludes that:

> Four distinguishing patterns characterize the Jewish introspections (a) gregariousness or strong social dependence, (b) submissiveness, (c) drive and over-reaction, (d) feelings of insecurity (emotionality or instability).[7]

In a recent study Sukov and Williamson[8] administered the Rundquist-Slette Test and the Bell Adjustment Inventory to several groups of male and female Jews and non-Jews. From the Rundquist-Slette scale they obtained measures of morale, inferiority feeling, family relationships, economic conservatism, attitude toward law, educational attitudes and general adjustment. The Bell Inventory gave measures of general adjustment plus subdivisions of home, health, social and emotional adjustment. Of the critical ratios presented by the authors only those for "morale" and the Rundquist score of general adjustment for women were over three. In summarizing, the authors come to the following conclusions:

> For both sexes there are reliable differences between the mean scores made by Jewish and non-Jewish students on the Morale, Law, Education (women only) and General Adjustment of the Rundquist-Slette test. This suggests that the Jewish student has a more marked tendency toward maladjustment than has the non-Jewish student on the average.
>
> On the Bell Adjustment Inventory there are no significant differences between the two groups.[9]

PURPOSE OF THE PROBLEM

From the foregoing studies it appears that the difference or sameness of personality traits of Jews as compared to other national or racial groups has not been established. There seems to be conflicting evidence concerning their relative emo-

[7] *Ibid.*, p. 423.

[8] M. Sukov and E. Williamson, "Personality Traits and Attitudes of Jewish and Non-Jewish Students," *J. Appl. Psychol.*, 1938, 22, 487–492.

[9] *Ibid.*, p. 491.

tionality, feelings of inferiority, social dependence, and general adjustment.

It is therefore the purpose of this study to augment the existing information by the presentation of results of experimental data gathered independently by the investigator. And also to extend the field of inquiry by the inclusion of data on personality variables hitherto not considered.

COLLECTION OF THE DATA

The data for the present study constitute a part of the information gathered by the investigator for a doctoral dissertation on the relationship between athletic achievement and personality adjustment.[10] In the dissertation study 435 students at the College of the City of New York were employed to obtain the desired data. This number comprised three groups: 171 varsity athletes, 138 intramural athletes, and 126 non-athletes. Every subject filled out a personal information sheet giving his class in college, age, religion, and athletic experience. From the college records, information for each student was obtained as to his father's occupation and nationality. From the Personnel Bureau there was procured each student's score on the American Council on Education Psychological Examination given at the time of college entrance. In addition the investigator administered a battery of five questionnaires to the 435 students.

The Inventories. The instruments employed for the measurement of adjustment and the personality variables diagnosed by them may be listed as follows:

The Human Behavior Inventory[11] (H. B. I.)*

a. Work efficiency (Work Eff.)
b. Superiority-inferiority (Sup. Inf.)
c. Social acceptability (Soc. Acc.)
d. Emotional stability (Emot. Stab.)

[10] A. Sperling, *The Relationship between Personality Adjustment and Achievement in Physical Education Activities*, Doctoral Thesis, School of Education of New York University, 1941, 105 pp.

[11] R. B. Smith, *Growth in Personality Adjustment Through Mental Hygiene.*

e. Objectivity	(Obj.)
f. Family relationships	(Fam. Rel.)
Introversion-Extroversion Scale[12]	(I–E)
g. Introversion	(Int.)
h. Extroversion	(Ext.)
Ascendance-Submission Reaction Scale[13]	(A–S)
i. Ascendance	(Asc.)
j. Submission	(Sub.)
A Social Study[14]	(C–L)
k. Conservatism	(Con.)
l. Liberalism	(Lib.)
A Study of Values[15]	(Val.)
m. Theoretical	(Theo.)
n. Economic	(Eco.)
o. Aesthetic	(Aes.)
p. Social	(Soc.)
q. Political	(Pol.)
r. Religious	(Rel.)

* The abbreviations in parentheses are the designations of the scales and variables as they may be used on occasion for conservation of space.

Each of these scales is described in detail in the bibliographical references noted. A brief description of the method of selection, validity, reliability and purport of each scale and its traits is also contained in the aforementioned dissertataion.[16]

Choosing the Groups. For the purposes of the present study the data record for every non-Jewish student was secured. Since the student records were alphabetically arranged in each

[12] P. S. DeQ. Cabot, "The Relationship between Characteristics of Personality and Physique in Adolescents," *Genet. Psychol. Monog.*, 1938, 20, 32.

[13] G. W. Allport and F. H. Allport, "A Test for Ascendance-Submission," *J. Abn. Soc. Psychol.*, 1928, 23, 118–136.

[14] M. H. Harper, *Social Beliefs and Attitudes of American Educators*, pp. 35–43.

[15] G. W. Allport and P. E. Vernon, *A Study of Values*, 11 pp.

[16] A. Sperling, *op. cit.*, pp. 13–29.

of the 3 groups varying in athletic ability the record for a Jewish student nearest each non-Jewish record was chosen in order to obtain an equal number of cases for each group and the best random match. There was thus procured data for a Jewish group and a non-Jewish group totalling 160 cases. In each of the two groups there were 45 varsity athletes, 23 intramural athletes and 12 non-athletes.

TREATMENT OF THE DATA AND RESULTS

Comparative Background Information about the Groups. The general descriptive information obtained for the 160 cases from the Information Blanks and the college records has been arranged in tabular form and variously treated to illustrate best the similarity or differences between the Jewish and non-Jewish groups. The data are presented in Tables 1–5. These tables require no special explanation as to procedure, since very simple tabulations and treatment were involved.

TABLE 1

Parental Nationality of the Subjects

Natal country of father	Jews		Non-Jews	
	No.	Per cent	No.	Per cent
United States	18	22½	27	33¾
Russia	29	36¼	4	5
Poland	13	16¼	2	2½
Austria Hungary	11	13¾	13	16¼
Germany Latvia Rumania Lithuania	7	8¾	0	0
Italy	0	0	19	23¾
France	0	0	4	5
Miscellaneous	2	2½	11	13¾
	80	100	80	100

TABLE 2

Religious Derivation of the Subjects

	Catholic		Protestant		Other	
	No.	Per cent	No.	Per cent	No.	Per cent
Non-Jews	55	68¾	22	27½	3	3¾

As might be expected the parental nationality of the Jewish group is drawn for the most part from the Eastern European countries. The non-Jewish group has a slightly greater number of American born parents and a decidedly larger number that are Italian born. Among the non-Jewish group in this study the percentage of Catholics is more than twice the Protestant number.

The data of Table III indicate the non-Jewish group to have a larger number of parents employed in the unskilled and semi-skilled manual occupations. The Jewish group has a larger number of parents in business occupations. In general, the parental occupational levels of the two groups as a whole do not seem to be too greatly divergent.

TABLE 3

Ratings on the Beckman Scale of Occupations for the Parents of the Subjects in the Two Groups

	Grades of occupational scale	Jews	Non-Jews
		No. cases	No. cases
I	Unskilled manual occupation	0	6
II	Semi-skilled occupation	0	10
III	a) Skilled manual occupation	28	24
	b) Skilled white collar	18	15
IV	a) Sub-professional	3	3
	b) Business	14	8
	c) Minor supervisory	3	1
V	a) Professional (linguistic)	4	2
	b) Professional (scientific)	3	5
	c) Managerial and executive	1	1

TABLE 4

Age in Years of the Two Groups

Groups	Mean	S.D.	N
Jews	19.64	1.8	80
Non-Jews	20.22	1.7	80

The mean ages in Table 4 indicate the Jewish group to be about ½ year younger than the non-Jewish group. The calculations in Table 5 show the Jewish group to be on the average ½ of a semester higher in college class level. The lower mean age and higher class level of the Jewish group points to a general educational acceleration of about ¾ of a year for this group over the non-Jewish group.

The mean scores of Table 6 represent the average of the percentile ratings for the two groups on the American Council Examination taken by the subjects at the time of their admission to college. This examination is considered a test of general intelligence for college freshmen. Percentile scores were taken because a newly revised form of this test is given to each

TABLE 5

Educational Status of the Subjects by Groups

College class	Jews N = 80		Non-Jews N = 80	
	No.	Per cent	No.	Per cent
Lower freshman	2	2.5	1	1.2
Upper freshman	5	6.2	6	7.5
Lower sophomore	19	23.7	24	30.0
Upper sophomore	12	15.0	12	15.0
Lower junior	11	13.7	12	15.0
Upper junior	6	7.5	8	10.0
Lower senior	11	13.7	7	8.7
Upper senior	14	17.5	9	11.2
Post graduate	0	0	1	1.2
Average No. of semesters in college	4.96		4.63	

entering class and the range of scores changes with every revision of the test. To determine the reliability of the difference in mean scores between the two groups, the technique of critical ratios[17] or mean difference (M diff.) divided by the standard error of the difference between the two means (σ diff.) was adopted. In this case the critical ratio of 2.4 is not large enough to be statistically reliable. Although the magnitude of the C.R. is less than 3 (the limit generally taken as complete statistical reliability) it does indicate what may be termed a significant tendency for the Jewish group to score higher on the intelligence test.

TABLE 6

Percentiles of the Groups in the American Council on Education Psychological Examination

Groups	N	M	S.D.	C.R.
Jews	73	75.26	20.4	2.4
Non-Jews	74	67.13	20.4	

Comparison of Central Tendencies of Scores in the Inventories. The scores on the battery of inventories for the two groups were recorded and organized in frequency distribution tables. Means and standard deviations were obtained for each group on the respective scales and the personality variables of these scales. Critical ratios of the differences between the means of the two groups were computed for each of the sixteen variables. These data are summarized in Table 7.

In reading Table 7 it should be borne in mind that higher scores on the Human Behavior Inventory are in the direction of maladjustment. For the Introversion-Extroversion, Ascendance-Submission and Conservatism-Liberalism scales, the higher the scores the greater the extroversion, ascendance, and liberalism. Conversely, the lower the scores the greater the

[17] H. E. Garrett, *Statistics in Psychology and Education*, Longmans Green & Co., New York, 1937, pp. 128–130.

TABLE 7

Personality variables	Jews N = 80		Non-Jews N = 80		C.R.
	M	S.D.	M	S.D.	
Human behavior Inventory total	116.75	39.00	113.70	35.40	.51
Work Efficiency	13.30	5.20	13.20	4.92	.12
Superiority Inferiority	14.40	5.24	15.88	5.40	1.66
Social Acceptability	15.50	5.90	16.28	5.57	.86
Emotional Stability	29.45	12.05	29.19	8.96	.16
Objectivity	18.97	6.61	19.52	6.31	.53
Family Relationships	30.55	12.84	27.72	10.66	1.51
Introversion Extroversion	65.80	8.40	62.30	8.82	2.59
Ascendance Submission	8.71	17.79	2.38	17.22	2.30
Conservatism Liberalism	57.97	9.21	51.85	9.96	4.05
Theoretical	33.85	6.70	31.92	6.18	1.91
Economic	30.38	7.30	29.60	6.59	.71
Aesthetic	25.95	7.20	26.25	9.50	.22
Social	35.33	6.00	32.60	6.20	2.84
Political	32.55	6.70	33.28	6.59	.74
Religious	21.38	6.46	27.05	7.78	5.15

introversion, submission and conservatism. On the Values scale, the higher the score the greater the relative strength of that value and vice versa.

In Table 7 the critical ratios of the mean scores between the Jewish and non-Jewish group on the Human Behavior Inventory and its sub-sections range from .12 to 1.66. This indicates a lack of any significant difference between the two groups in the total adjustment score or in any trait aspect of the Inven-

tory. Nor is there a definite trend visible in the mean differences. On some of the sections the Jewish group points in the direction of better adjustment while in other sections the non-Jewish group manifests a slightly better score.

On the Introversion-Extroversion and Ascendance-Submission scales, the Jewish group appears to be significantly more extroverted and ascendant, the critical ratios being respectively 2.59 and 2.30.

In the Conservatism-Liberalism scale the Jewish group has a statistically reliable higher mean score in the direction of liberalism with a critical ratio of 4.05.

On the scale of interest values the Jewish group shows a higher theoretical and social score, critical ratios equal 1.91 and 2.84 respectively. While the non-Jewish group manifests a statistically reliable higher religious score, critical ratio 5.15.

DISCUSSION

In failing to illustrate any significant difference in general adjustment between a group of Jews and non-Jews, this study seems to corroborate the findings of most of the objective evidence gathered to date. The greater extroversion and ascendance shown by the Jewish group is in keeping with the popularly held opinion about the group with reference to these two traits. It is of interest to note that the level or degree of extroversion and ascendance is just on the positive side and tends to indicate a healthy rather than an unhealthy condition of adjustment. The higher liberalism score of the Jewish group and the lower religious score agree with the results of previous studies.[18, 19] The educational acceleration and higher intelligence scores of this group have similarly been indicated many times previously, notably Garrett's[20] study mentioned earlier in this report.

[18] G. B. Vetter, "The Measurement of Social and Political Attitudes and the Related Personality Factors," *J. Abn. and Soc. Psychol.*, 1930, 25, 178.

[19] H. Cantril and G. W. Allport, "Recent Applications of the Study of Values," *J. Abn. and Soc. Psychol.* (ap. 1933–Mar 1934), 28, 270.

[20] H. E. Garrett, *op. cit.*, p. 346.

At this point it is this writer's opinion that it would be amiss to enter into a theoretical discussion of the reasons for the differences or resemblances between the groups. Whenever racial or national differences are indicated the time worn discussion of nature and nurture is brought into the picture in an attempt to support or explain away the differences. The step following a study as the present one, does not call for dialectics on the wherefores of the findings but rather the initiation of a comprehensive study encompassing a more universal sampling of subjects for the purpose of corroborating or negating the findings of this report.

CONCLUSIONS

1. No significant trends or differences were found between a Jewish group and a non-Jewish group in their mean scores on a general adjustment scale or any of its sub-sections pertaining to work-efficiency, superiority-inferiority, social acceptability, emotional stability, objectivity, and family relationships.

2. The Jewish group scored themselves higher in extroversion, ascendance, and liberalism than the non-Jewish group, the critical ratios of the differences between the means being respectively 2.59, 2.30, and 4.05.

3. In interests the non-Jewish group were reliably higher than the Jewish group in their religion score, C.R. 5.15. While the Jewish group scored higher in the theoretical and social (love of people) interests, C.R. 1.91 and 2.84 respectively.

4. The Jewish group were indicated to be educationally accelerated about three fourths of a year over the non-Jewish group.

5. The mean percentile score on the Thurstone Intelligence test was higher for the Jewish group than the non-Jewish group, C.R. 2.4.

BIBLIOGRAPHY

ALLPORT, G. W., AND ALLPORT, F. H. A test for ascendance-submission. *J. Abn. and Soc. Psychol.*, 1928, 23, 118–136.

———, AND VERNON, P. E. *A Study of Values.* Massachusetts: The Riverside Press, 1931. 11 pp.

BECKMAN, R. O. A new scale for gauging occupational rank. *Personnel J.*, 1934, 13, 225–233.

CANTRIL, H., AND ALLPORT, G. W. Recent applications of the study of values. *J. Abn. and Soc. Psychol.*, 1933, 28, 259–273.

DEQ CABOT, P. S. The relationship between characteristics of personality and physique in adolescents. *Genet. Psychol. Monog.*, 1938, 20, 3–120.

GARRETT, H. E. Jews and others—some group differences in personality, intelligence and college achievement. *Personnel J.*, 1929, 7, 341–348.

HARPER, M. H. *Social Beliefs and Attitudes of American Educators.* Contributions to Education, No. 294. New York: Bureau of Publications, Teachers College, Columbia University, 1927. 91 pp.

RUMYANECK, J. The comparative psychology of Jews and non-Jews. *Brit. J. Psychol.*, 1930–31, 21, 404–426.

SMITH, R. B. *Growth in Personality Adjustment through Mental Hygiene.* Albany, New York, 1936. 71 pp.

SUKOV, M., AND WILLIAMSON, E. G. Personality traits and attitudes of Jewish and non-Jewish students. *J. Appl. Psychol.*, 1938, 22, 487–492.

SWARD, K. Patterns of Jewish temperament. *J. Appl. Psychol.*, 1935, 19, 410–425.

———, AND FRIEDMAN, M. B. Jewish temperament. *J. Appl. Psychol.*, 1935, 19, 70–84.

VETTER, G. B. The measurement of social and political attitudes and the related personality factors. *J. Abn. and Soc. Psychol.*, 1930, 25, 149–189.

AN IMPROVED METHOD FOR SCORING THE PRESSEY X–O TEST

LOWELL L. GIFFEN
Knoxville, Tennessee

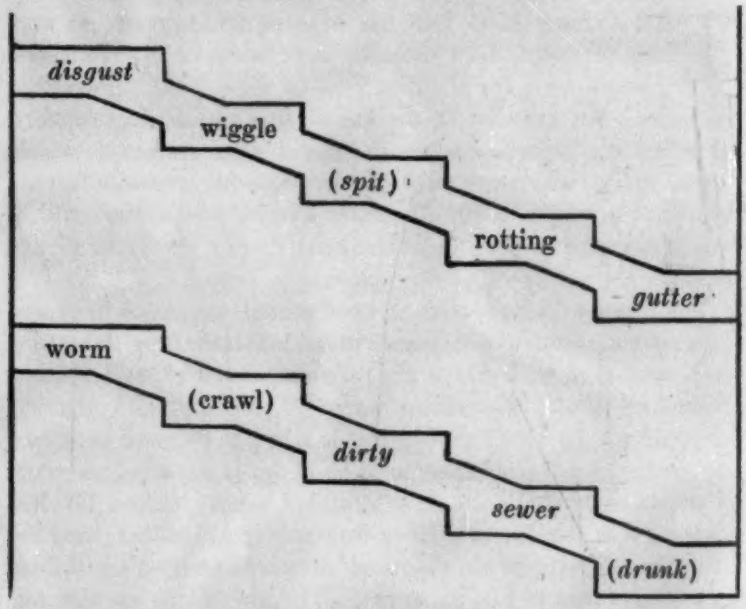
THE Pressey X–O Test has enjoyed widespread use and has proved to be a valuable instrument of the free association type for the diagnosis of individual personality patterns. An increase in the use of this test could probably be effected through certain technical improvements which would render scoring of the test more economical and efficient. This article proposes and describes scoring stencil keys which would accomplish such improvements merely by slight printing changes not affecting the content of the test.

The Pressey Test consists of word stimuli arranged in grammatically unrelated order and classified into four sub-tests, each concerned with one of the following factors: basic human drives, emotional association, sense of morality, and anxiety tendencies. In Test I the subject is asked to respond to words suggesting unpleasantness; in Test II, he is required to react to words associated with other specified terms; in Test III, his responses to words suggesting immorality are noted; and in Test IV, he records his reactions to words suggesting things which have caused him to worry. The words in each test are arranged in twenty-five rows of five words each. On each test the subject is instructed first to strike out as many or as few words as he chooses; and then he is asked to go back over the test and encircle that single word in each line which evokes the most intense response. Thus on Test I, for example, he first strikes out as many or as few words as he thinks suggest unpleasantness; then he goes back and encircles the most unpleasant word in each line. In case he has stricken out

none of the words in a particular line, he encircles the word which is the least pleasant.

Each test yields measures of (1) the degree of emotional response, reflected in the number of words crossed out, and (2) the normality of response, reflected in the proportion of words encircled corresponding to the words most commonly encircled by all subjects.

Tests I and IV also yield descriptions of emotional patterns, however, since the words are classified into types and the rela-



tive proportion of each type of word selected can be studied. In Test I the words are classified according to four types of human drives, namely, for new experience, for security, for affection, and for recognition of the individual, and the relative strength of these different drives as related to one another can be determined. In Test IV the words are classified according to different types of human reactivity, such as suspicion, neuroticism, self-consciousness, melancholia, and hypochondria.

The determination of these two emotional patterns is the most significant value of the test. In fact many personality analysts use the test only for this purpose. It is the measurement of these patterns which requires by far the most extensive and elaborate scoring techniques. The function of this article is to describe improved scoring techniques for measuring these emotional patterns.

In each test the words are arranged systematically but in a pattern not detectable by the subject. An illustration from a portion of Test I[1] in which the subject has marked unpleasant words is shown below (italicized words are to be considered as crossed out and parentheses should be regarded as circles):

1. (*disgust*) fear sex *suspicion* aunt
2. roar divorce (*dislike*) sidewalk wiggle
3. *naked snicker* wonder (*spit*) fight.
4. (failure) home rotting snake hug
5. prize *gutter* (*thunder*) breast insult
6. worm tremble *street-walker* (*rival*) city

The principal task in scoring the test is to determine how many words of each type the subject has stricken out and how many he has encircled. The "strike-out" and "circle" patterns should tend to substantiate each other. The most common scoring device heretofore used is a transparent stencil, partially illustrated below, which fits over the test and bears code numbers indicating the classification into which each word falls.

1	2	3	4	5
2	3	4	5	1
3	4	5	1	2
4	5	1	2	3
5	1	2	3	4
1	2	3	4	5

There are three common scoring procedures with this stencil: (1) the scorer selects all words of one type and records the total number either stricken out or encircled; (2) the scorer

[1] One word in each row of Test I is a 'joker' in order that the carefulness of the subject's discrimination may be noted.

examines each marked word in order and tallies each response on a tally sheet in its appropriate category; (3) the scorer reads aloud all responses in order of occurrence and an assistant tallies the responses. The first method requires the scorer to spend much time hunting for the particular type of word he is scoring; the second requires frequent shifting of vision from the test to the tally sheet; the third requires two persons as scorers. Each method is susceptible to considerable clerical error.

The proposed scoring stencil enables a single person to score accurately the frequency of response to each type of word without losing time selecting words of a particular type or without switching his vision frequently from test to tally sheet, thereby effecting speed and accuracy of scoring. Actual experiments with the proposed stencil indicate that the scoring time, especially for determining the differential patterns in Test I and Test IV, could be reduced by approximately one-half. To use the stencil it would be necessary to arrange the words in vertical columns as well as horizontal rows; if they were spaced the same on all tests, the same stencil would be applicable to all of them. Such an arrangement would also have a better appearance and be more readable for the subject. The preferable word arrangement is shown below (for illustrative purposes the numerical symbols for word types are substituted for the actual words):

1.	1	2	3	4	5
2.	5	1	2	3	4
3.	4	5	1	2	3
4.	3	4	5	1	2
5.	2	3	4	5	1
6.	1	2	3	4	5

According to this arrangement words of the same type appear along diagonals descending from left to right.

The proposed scoring stencil consists of a card with five diagonal slits so cut to expose completely at a single time all and only the words of a single type. The illustration below

shows part of the stencil superimposed on the portion of Test I which was illustrated previously. The horizontal lists of words have been rearranged to form the desired pattern. All the words of the first type are exposed in the slits, and the words crossed out (italicized) or encircled (in parentheses) can easily be counted. By moving the stencil upward one row all the words of the second type would be exposed, etc.

The other fundamental scoring task is to determine the number of times the subject encircles the modal response. The process can be accomplished easily without a scoring key, for a scoring clerk should soon learn all the modal words and could rapidly scan the test to determine the number of lines in which the modal word is encircled. However, a second technique would involve the use of a stencil, applicable to the test in its present printed form, in which openings were made for only the modal words, and the number of circles in these openings could be easily counted.

SUMMARY

Present scoring techniques for the Pressey X–O Test have been analyzed and a scoring stencil is proposed which should reduce the scoring time about one-half.[2] In addition, the scoring accuracy would be increased and the slight printing changes required would improve the appearance and readability of the test. Such a stencil would require that the words be printed in orderly diagonal rows according to word type. Only the words of a single type would be exposed at a single time for purposes of scoring, but the stencil could be easily shifted so as to expose the words of any other type. The general principle of arrangement might be applied to other types of objective tests.

[2] The Pressey X-O Test is distributed by the C. H. Stoelting Company. Inquiries regarding the new scoring stencil and the revised edition of the test should be directed to the publishers.

A NOMOGRAPH FOR ESTIMATING THE VALIDITY OF TEST ITEMS

C. H. LAWSHE, JR.

Division of Education and Applied Psychology, Purdue University

NUMEROUS statistical techniques for estimating the validity of individual test items have been reported in the literature and have been reviewed by Guilford[1] and Long and Sandiford.[2] Many of these techniques for determining the discrimination value of items involve the use of the proportion of successes on the item among groups known to possess or assumed to possess different amounts or levels of the ability, knowledge, or trait being measured.

The present paper concerns the technique reported by Long and Sandiford who credit its development to Truman L. Kelley. In short, the "Kelley technique" consists of the following steps:

1. Determine the percentage of successful responses to a given item by members of the "high" criterion group.
2. Determine the percentage of successful responses to the item by members of the "low" criterion group.
3. Using the appropriate normal probability curve tables, find the standard score or z score value of the ordinate which subtends the percentage found in Step 1.
4. Find the corresponding value for the percentage found in Step 2.
5. Determine the discrimination value or validity index by subtracting the result obtained in Step 4 from the result obtained in Step 3.

[1] J. P. Guilford, *Psychometric Methods*. New York: McGraw-Hill Book Co., 1936, pp. 426–437.

[2] John A. Long and Peter Sandiford, *The Validation of Test Items*, Bulletin No. 3, Department of Educational Research. Toronto: University of Toronto, 1935, pp. 16–50.

The labor involved in following through the above procedures for several hundred items led to the development of the nomograph presented herewith as Figure 1. The nomograph greatly reduces the time necessary to estimate *D-values* or discrimination values and has been found quite adequate

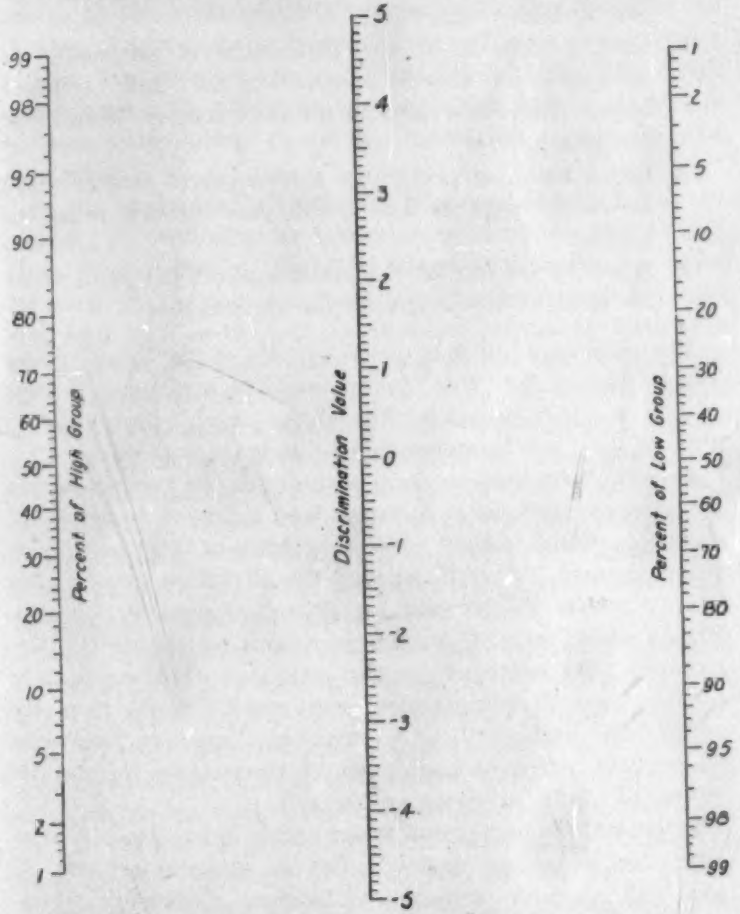


FIG. 1. A nomograph for estimating the validity of test items by the "Kelley technique."

in terms of accuracy. The nomograph is used by following the steps below:

1. Having determined the percentage of successful responses to a given item by members of the "high" criterion group, locate this value on the scale marked "Percent of high group."
2. Having determined the percentage of successful responses to the item by members of the "low" criterion group, locate this value on the scale marked "Percent of low group."
3. Lay a ruler, or preferably a transparent straight-edge, across the page so that it will pass through these two points.
4. Read the *D-value* on the center scale at the point where the straight-edge intersects the vertical line.

For example, a test item passed by 84% of the "high" group and by 50% of the "low" group would be assigned a *D-value* of 1.0. Another passed by 90% of the "high" group and by 40% of the "low" group would be assigned a *D-value* of 1.5.

Because the normal curve is asymptotic, the two percentage scales in the nomograph have not been extended beyound 1% and 99%. Should values outside the limits of this range occur, it is suggested that 99% be used for all values greater than 99% and that 1% be used for all values smaller than 1%. Errors which result from this procedure will be on the conservative side inasmuch as the estimated *D-values* will be smaller than if computations were made directly from the tables. The problem is not a serious one, however, because of the relative infrequency with which percentages fall outside the range employed in the nomograph.

In general the nomograph is applicable in two kinds of item validation situations, namely when an external criterion is used and when the criterion of internal consistency is employed. In the case of the former, "high" and "low" criterion groups are selected by some technique or instrument independent of the test under consideration. Examples in-

clude employees with high production records vs. employees with low production records, "high" rated employees vs. "low" rated employees, apprentices vs. journeymen, persons with a small amount of training vs. those with greater amounts of training, etc. Application of the "Kelley technique" by means of the accompanying nomograph makes possible the ranking of test items in terms of how well each discriminates between the criterion groups. Then the inferior items which either impair the efficiency of the test or add to its length without contributing to its discrimination power may be eliminated.

In the absence of an external criterion, *D-values* may be assigned by utilizing the criterion of internal consistency. Here, it is reasoned, that the knowledge, ability, or trait measured by the test is possessed in greater amount by those who score high on the test and in lesser amount by those who score low on the test. Total scores on the test prior to the item analysis become the criterion, while the highest scorers and the lowest scorers constitute the criterion groups. Upper quartile vs. lower quartile, upper third vs. lower third, or if the population is so small as to demand it, upper half vs. lower half may be employed. Needless to say, the more extreme the groups, the larger the obtained *D-values* will be. In the same fashion as indicated in the last paragraph, inferior items may be eliminated from the instrument.

Some investigators will also find the nomograph useful in assigning weights to inventory items. It will be noted that all *D-values* below the mid-point of the center scale are negative. When it is desirable to weight items on personality inventories, preference scales, or other instruments, the percentages of the criterion groups responding to a specific item in a given way may be located on the appropriate scales of the nomograph and the corresponding *D-value* used as the item weight. Values may be used as read from the nomograph or may be multiplied or divided by a constant to increase or decrease the range of weights.

COMPARISON OF OTIS AND ALPHA TEST SCORES MADE BY BANK CLERKS

EDWARD N. HAY AND ARLINE M. BLAKEMORE
The Pennsylvania Company, Philadelphia, Pa.

THE Otis Self-Administering Test of Mental Ability, Higher Examination Form B, has been used for the past seven years in the employment of clerks at The Pennsylvania Company and it has proven a very suitable instrument for this purpose. However, an increasing number of employers and high schools are using the test and a few schools are drilling students with it in preparation for their employment upon graduation. In an effort to find a test not in common use the first Nebraska revision of Alpha was given experimentally to 71 bank clerks, 57 of whom were machine bookkeepers and nearly all of whom were high school graduates. The table shows the results.

It will be seen that Alpha scores have a strong negative skew and are bunched towards the ceiling of the test. This seems to be due to easy time limits on some of the sub-tests. For example, 43 of the 71 subjects finished sub-test number eight within the allotted time. Nineteen completed sub-test five, 12 finished test seven, 6 finished test four and 4 completed test three. It was concluded that this revision of Alpha was not a satisfactory substitute for Otis, but might be if sub-test times were shortened.

Frequency Distributions of the Scores Made by the Same Persons on the Otis Self-Administering Higher Examination, Form B, 20-Min., and the First Nebraska Revision of Army Alpha

Otis		Alpha	
Score	Frequency	Score	Frequency
16–20	8	35– 49	2
21–25	5	50– 64	2
26–30	6	65– 79	3
31–35	10	80– 94	5
36–40	12	95–109	5
41–45	12	110–124	8
46–50	11	125–139	15
51–55	3	140–154	16
56–60	2	155–169	10
61–65	1	170–184	3
66–70	1	185–199	2
Mean:	37.5		128.8
Median	38.2		135
Standard Dev.	11.3		33
Number	71		71
Median, Published Norms*	32		61

Women Clerical Applicants Tested at The Pennsylvania Company

	Otis, 20-min.
Mean	36.7
Standard Dev.	10.6
Number	1436

* Otis group were high school students.
Alpha group were 1,500,000 army men.

TESTING CLERICAL APPLICANTS

EDWARD N. HAY AND ARLINE MANCE BLAKEMORE
The Pennsylvania Company

TESTING of clerical applicants at The Pennsylvania Company was inaugurated in 1934 and has been an indispensable part of the selection program ever since. Our company is a commercial bank and trust company and there are over 1000 clerical employees. Since June, 1937, very careful records of applicants' test scores have been kept and are given here for the benefit of other business organizations that may be using the same tests. The validity of these tests is not discussed here, but needless to say has been amply established during the past eight years.

The more useful tests are:

Otis, S–A, Form B, 20-min.
Minnesota Clerical, Number Checking
Minnesota Clerical, Name Checking

Soon after the Otis test was adopted it became necessary to determine the critical score for clerical workers. This was done by borrowing from the experience of Pond at Scoville Manufacturing Company and Wadsworth at Southern California Gas Company. The minimum score adopted for clerical workers was 36 for 20-minute administration. We had already found that the ceiling of the 30-minute administration was too low and produced a crowding of scores at the top with resulting loss of discrimination. Our experience to date has amply justified the use of a minimum score of 36 for all clerks and a requirement of higher scores for persons who are promoted very far.

The distribution of the Otis scores is shown in Table 2.

TABLE 1

Otis Self-Administering Test of Mental Ability, Form B, 20-Minute

Percentile	Men	Women
99.9	74.0	71.0
90	56.4	51.0
80	49.7	45.1
70	45.9	41.9
60	42.5	38.9
50	39.2	36.2
40	35.6	33.4
30	31.2	30.6
20	26.8	27.4
10	20.4	23.4
0	3.0	2.0
N	1074	1436

TABLE 2

Distribution of Scores of Otis S–A Test, Form B, 20-Minute

Score	Men	Women
70–74	4	3
65–69	12	8
60–64	42	23
55–59	68	44
50–54	80	81
45–49	140	130
40–44	169	226
35–39	146	267
30–34	120	254
25–29	122	218
20–24	69	118
15–19	56	56
10–14	36	5
5– 9	6	2
0– 4	4	1
	1074	1436
Mean	38.6	36.7
Standard Deviation	11.2	10.7

The Minnesota Test for Clerical Workers has been useful in distinguishing among persons of adequate intelligence those of satisfactory minimum suitability for routine clerical work. Wide differences in average scores for different occupational groups are known to exist, with the clerical group much higher than most other distinct groups, such as mechanical. In a group of machine bookkeepers we have found a critical score of 130 in name-checking and number-checking.[1]

TABLE 3

Minnesota Test for Clerical Workers

Percentile	No.-Checking		Name-Checking	
	Men	Women	Men	Women
90	151.3	163.0	158.4	168.2
80	138.1	150.1	146.8	155.6
70	128.4	141.9	137.1	146.3
60	120.6	134.7	128.4	138.8
50	114.3	127.6	120.5	132.0
40	108.3	120.4	113.4	124.9
30	102.8	113.7	105.5	116.9
20	96.0	106.3	95.7	106.8
10	86.8	96.0	82.5	94.1
N	736	1461	752	1472

The differences between men and women are highly significant.

The distribution of scores of Minnesota Clerical Test is quite regular as may be seen in Table 4.

[1] Edward N. Hay, "Tests in Industry," *Personnel Journal*, May, 1941.

TABLE 4

Distribution of Scores—Minnesota Test for Clerical Workers

Scores	Frequencies			
	No.-Checking		Name-Checking	
	Men	Women	Men	Women
200				
190–199	2	16	4	19
180–189	5	20	6	41
170–179	15	44	17	68
160–169	21	95	38	106
150–159	35	118	62	136
140–149	55	179	74	194
130–139	73	211	85	214
120–129	94	202	95	205
110–119	119	217	107	152
100–109	134	179	85	133
90– 99	90	85	67	96
80– 89	61	64	49	64
70– 79	22	25	37	27
60– 69	10	6	21	14
50– 59	0	0	5	2
40– 49	0	0	0	0
30– 39	0	0	0	1
N	736	1461	752	1472
Mean	117.1	128.5	121.0	131.5
Standard Deviation	24.7	25.5	28.3	27.8

NEWS AND NOTES

The Salmon Committee on Psychiatry and Mental Hygiene in sponsoring the Tenth Series of the Thomas William Salmon Lectures presented Dr. Emilio Mira, formerly Professor of Medicine, Philosophy and Economic and Social Science at the University of Barcelona, Spain, and Chief Psychiatrist of the Loyalist Forces in Spain, in three lectures during the month of November. In the first lecture, Dr. Mira discussed "The Psychopathology of Fear and Anger Reactions in War Time." His second topic included the "Duties of a psychiatrist at war. Aims and means. Personal experience obtained in the Spanish War, 1936–39," and the third, "New techniques of control and detection of the 'fighting power' in the individual and the group."

Dr. Mira was educated in Spain, receiving his license in Medicine at the University of Barcelona and his medical degree at the Central University of Madrid, and has studied and taught in Germany, France, Switzerland and England. He is the author of numerous scientific works, the most comprehensive of which is his "Manual of Psychiatry," now widely used in Spain and also in South America. He has edited several psychiatric journals and is a frequent contributor to the psychiatric journals of three continents. An authority on Spanish war neuroses, Dr. Mira has also considerable knowledge concerning the development of war psychology and psychiatry in Germany. He has originated a new technique of psychological testing and has invented the axisterometer, a device used to determine the fighting power and other dominant characteristics of soldiers and civilians.

Dr. Mira was in this country during the summer of 1929 and gave courses in psychology at Ohio University. He was in this country again some three years ago following his brief stay in England following the Spanish Civil War, during which time he carried on research work in some of the hospitals of England. Dr. Mira left England to give a series of lectures first in the United States and later in Havana, Cuba. He is now located and has been for some two years past in Buenos Aires, Argentina, doing work in practical psychiatry, giving lectures and writing books. Because of his work in Spain and because of his wide experience and because of his great achievements in psychiatry, psychology and

closely related fields, we hope that everything possible will be done to bring Dr. Mira frequently to the United States. In our judgment, there is no better way to bring about a better mutual understanding of the people of Argentina and of the United States.

Following his three lectures in New York in November, Dr. Mira appeared in a number of key cities through the country. His schedule included Philadelphia, Boston, Houston, Texas; San Diego, California; Randolph Field, Texas; San Antonio, and New Orleans. Dr. Mira's friends at Ohio University were very much disappointed that priorities in travel by plane made it impossible for him to give lectures at Ohio University.

Anyone interested in learning more about Dr. Mira's lectures and work should get in touch with Dr. C. Charles Burlingame, Chairman, The Salmon Committee on Psychiatry and Mental Hygiene, 610 Park Avenue, New York City.

At the sixth annual meeting held in New York City on September 4, 1942, the American Association for Applied Psychology announced the elections of Lieutenant Commander C. M. Louttit, U.S.N.R., as President, and of Dr. Alice I. Bryan, Columbia University, as Executive Secretary.

A professional affiliation between the Department of Nursing of the College of Physicians and Surgeons of Columbia University and the Neuro-Psychiatric Institute of the Hartford Retreat is announced jointly by Miss Margaret E. Conrad, Professor and Executive Officer of the Department of Nursing of Columbia's College of Physicians and Surgeons, and Dr. C. Charles Burlingame, Psychiatrist-in-Chief of the Neuro-Psychiatric Institute. Under this affiliation, students with university degrees who are receiving advanced time credit in the Department of Nursing, College of Physicians and Surgeons of Columbia, will undertake an intensive two months' course in neuro-psychiatric nursing at the Institute, under the direction of the Institute's medical and nursing staffs. Fifteen students are expected to begin classes in December.

Dr. Wallace H. Wulfeck, formerly Associate Director of Marketing Research at the Psychological Corporation of New York, has been appointed Director of Research for the Federal Advertising Agency of New York.

In the November issue of *Parents' Magazine* appears a report by Lillian F. Stempel of a new treatment of strabismus, or crossed eyes, which is being carried on at the experimental clinic of the Columbia University

School of Optometry under the supervision of Dr. Frederick W. Brock. A number of cases selected because they were considered difficult to cure responded to the new method satisfactorily. The method of treatment is mind over matter. "Strabismus," says Miss Stempel, "is a habit of seeing incorrectly, built up gradually by individuals who find themselves with a slight deviation in the line of their vision, perhaps because of illness, or shock or heredity. Most people don't realize that the squinter's world is a different world. The method used at the Columbia Clinic was based entirely on a new understanding of how the squinter sees. Reduced to its simplest terms, it is a process of unlearning—of breaking down the mode of vision a person with crossed eyes has built up for his convenience, and teaching him to see correctly. His seeing process must be retraced." She goes on to describe an individual case to illustrate the treatment in detail, and concludes by saying that "it seems reasonable to hope that in the not too distant future, children will have their eyes straightened by being taught how to see correctly."

The Occupational Index, established in 1936 under a grant from the Carnegie Corporation, has just announced that in the future it will review, annotate, index, and evaluate all new publications on military occupations; including all books and pamphlets which describe the attractions and the disadvantages, the opportunities and requirements of all branches of the Army, Navy, Marines, Coast Guard, Air Corps, Waacs, Waves, and Wows, and the Service Projects for Conscientious Objectors. New subscribers will receive a recommended list of publications already available. The Occupational Index is published quarterly at New York University; the annual subscription price is five dollars.

The National Research Council, 2101 Constitution Avenue, Washington, D. C., has recently issued through its various committees a number of reports on researches in the field of food habits. Dr. Kurt Lewin, Child Welfare Research Station, State University of Iowa, conducted one study entitled "The Relative Effectiveness of a Lecture Method and a Method of Group Decision for Changing Food Habits." Another report directed by Dr. Lewin is entitled "A Group Test for Determining the Anchorage Points of Food Habits." "Italian Food Patterns and Their Relationship to Wartime Problems of Food and Nutrition" is a report prepared by Genoeffa Nizzardini and Natalie F. Joffe.

BOOK REVIEWS

POFFENBERGER, A. T. *Principles of Applied Psychology.* D. Appleton-Century Company, Inc., 1942. New York, New York.

The names Applied Psychology and A. T. Poffenberger have become almost synonymous. His book, *Applied Psychology: Its Principles and Practice,* to which the present book is the successor, appeared in 1927. Even then he had already made notable contributions to the field. Since then he has been one of the most consistent as well as most productive exponents of applied psychology. Those who heard his Presidential address at the Ann Arbor meeting of the A.P.A. will remember its eloquent plea that psychologists descend from their ivory tower into the stream of men and affairs. In the light of developments since then, and particularly during the past year, Poffenberger may well feel like a prophet who has received honor in his own country.

His new book of 35 chapters and 114 figures reflects the enormous growth in the scope and materials of applied psychology. However, it is selective rather than encyclopedic in character. Its selections follow the main stream of applied psychology, which, as the author defines it, is "so to adjust differentially endowed individuals by training them, by selection of their environment, and by the control of this environment that they may attain the maximum of social productivity and the maximum of personal satisfaction."

This definition with its emphasis on the individual grows out of considerations broader than those of the traditional psychology of individual differences. It reflects "the growing recognition of, and respect for, the individual. These have always been the very foundation of democracy, and they have occupied a prominent place in both pure and applied psychology. Their significance has been magnified out of the ugly facts of the depression years and out of the repudiation of the individual by the totalitarian governments. It has now become all too clear that a successful social system demands the well-being, the comfort, and the satisfaction as well as the 'work' of the individual."

Thus the adjustment of the individual to his own satisfaction as well as that of society becomes the central theme of this book. Its general scheme and contents can well be summarized in the author's own words. "Any plan for dealing with such an extensive subject-matter will necessarily be arbitrary and incomplete and will have to be flexible enough to change as knowledge increases. However, it seems entirely feasible to set down

certain principles which will apply in attaining the goal of adequate adjustment. Thus, the consequence of having a certain remote and family ancestry, of being of a certain age and sex, of having to acquire habits and ideas according to the laws of learning will be specified. The probable effects of certain environmental conditions such as illumination, ventilation, and noise will be listed as well as the effects of modifying them. The influence of work, rest, and sleep, and of drugs and stimulants upon the human economy will be disclosed and allowed for. The means by which one can be directed into the vocation where he will fit best, and the conditions necessary for his efficient performance there will be described in so far as they are known. Certain maladjustments such as make one unfit for productive service or bring him into conflict with the law will be interpreted and methods of dealing with them will be examined. Finally, certain general observations upon the educational process as a means of making the most out of each and every unique individual will be made in the light of all the other topics previously discussed. This program will leave many specialized problems of adjustment untouched, but should give some useful hints even in these cases as to the methods which might be found useful in their solution."

This statement summarizes the plan of the book and its contents. However, the real distinction of the book is its treatment of subject matter. Under each topic the author presents a wealth of experimental evidence. These experiments have been carefully chosen to illustrate different aspects of the topic under discussion. Thus, in the chapter on "Intelligence in Adjustment," the author develops twelve sub-topics, each in terms of one or several experimental studies. These sub-topics move forward with a logical progression which adds much to the reader's interest and ease of understanding. If the reviewer's experience is indicative, mature psychologists will not only benefit by but enjoy Poffenberger's discriminating review of the field.

Topic by topic, the author evaluates the material he presents. He does this not as a salesman trying to make a case for applied psychology, but as a scientist disinterestedly appraising his techniques. His emphasis on methods rather than results is refreshing. It leads him to conclude that "the findings which rest on thoroughly sound research are few and the principles that are definitely established are fewer still."

The steps by which he reaches this general conclusion are indispensable in the education of present and future psychologists. Chapter by chapter he marshals the experiments which serve to define the problem, points out their strong and their weak points, and suggests the promising areas for future studies. In his chapter on Interests, for example, after discussing critically various types and tests of interests and their practical aspects, he concludes: "It seems probable that all persons fifteen years of age or older can some day be assigned to one of four or five interest

categories, and that such classification will show a high degree of stability from fifteen years to old age." The chapter on "Character" concludes with specific suggestions for measuring character traits and the recommendation that "research should be continued into the fundamental character traits and their generality and stability in order to pave the way for more economical character-measuring tools." The chapter on "Intelligence" concludes with a discussion of character and intelligence, and the statement that: "the researches that have been reported in this field (*i.e.*, the correlation between character and intelligence) suggest that a correlation of +.40 is the best that can be expected (102). A coefficient of this size allows for the numerous exceptions that will come to the mind of the reader—those cases where men of high intelligence have demonstrated their cruelty, dishonesty, selfishness, and immorality." Provocative evaluations like these characterize not only the chapter endings but most of the chapter topics as well. If some industrious person were to cull out these paragraphs, instructors in psychology would have a good list of projects for doctors' dissertations.

The ability to evaluate and to synthesize is probably the most needed ability in all fields of science today. Nowhere does the author display this ability more brilliantly than in his chapter on "Satisfaction as a Goal to Adjustment." In this discussion he formulates the problem of *power* vs. *desire* namely: "A serious social problem makes its origin from the fact that the desires of people are very similar whereas there are wide discrepancies in the power to satisfy them. Similarity in wants, difference in power, lead to dissatisfaction. Power for accomplishment—call it intelligence, although it is probably much more than that—is a natural endowment just as fundamental wants are, but it is not uniformly distributed as wants seem to be."

"It would seem that raising the general level of living will not solve the present difficulty because satisfaction is a relative and not an absolute quantity. One's bread and cheese is likely to turn sour in the mouth at the sight of another's cake and champagne. As the general level of living shifts, the purposes and ambitions shift along with it, while power does not thus shift. Indeed, it would appear that the higher the level of living rises the greater will be the unrest, for the greater will be the disparity between the Haves and Have-nots (in terms of intellectual power) unless increasing disparity is inhibited through artificial means. There scarcely seems to be the increase in satisfaction of the worker that might have been expected from the elevation of the standard of living during the last fifty to seventy-five years."

For this situation, the author concludes, there is no single or simple, no wholesale social remedy. The problem is a complicated one and, whatever the remedy, it must grow out of a thorough understanding of the nature of the individual or individuals.

In these days, when collective remedies for discontent are being so glibly advocated, the author's emphasis on the psychology of the individual should prove a wholesome antidote. He has purposely given less space to certain aspects which fall within the traditional province of social psychology, but no social psychology can afford to ignore the subjects he deals with.

No review could do justice to this book without some reference to its craftsmanship. There is, first of all, the author's lucid and swift-moving style which makes reading a pleasure. The mechanics of the book facilitate rather than hinder its reading. There is no turning back or forward to tables and illustrations. The book is beautifully printed.

HENRY C. LINK
The Psychological Corp.

TIFFIN, JOSEPH. *Industrial Psychology.* New York: Prentice-Hall, 1942. XVI + 386 pp.

The basic theme of this book is the integration of personnel psychology and personnel administration. The book deals with the industrial application of psychology in its broadest sense. The content and presentation show that the author maintains a close contact with industry. Much of the information reported resulted from research done by Tiffin and his associates in the Division of Education and Applied Psychology at Purdue University. Numerous illustrations are given of the industrial use of selection and placement tests. The presentation, in the language of industry, is sound but not academic. The purpose of the book seems to be to give a broad perspective of the industrial application of psychology, especially the application of aptitude studies to the field of personnel administration.

There is a valuable discussion of the several factors which operate to determine the functional value of a testing program to the employment manager. There is a timely emphasis upon the use of tests for the proper placement as well as the selection of employees. There is a development of the selection-ratio concept first proposed by Taylor and Russell of the Western Electric Company. Tiffin explains that a testing program can be useful to industry even when the labor supply is so restricted that all applicants must be hired for some job.

Three chapters are devoted to a rather orthodox description of various kinds of tests. This section would be more helpful if it maintained a more critical attitude toward the validity of the tests. The section of the appendix on statistical procedures will be of limited value because it is too condensed to be useful to the uninitiated and is not comprehensive enough to be useful to a person with statistical training.

Much of the material is new and highly valuable. The outstanding sections deal with industrial inspection, visual problems of industry, merit

ratings, industrial morale, and accidents. The treatment throughout is comprehensive but definitely readable.

The material contained in this book is a real contribution to both industry and psychology. Psychologists and personnel administrators will derive from this book valuable information regarding the industrial applications of psychology.

CHARLES C. GIBBONS
Owens-Illinois Glass Company,
Toledo, Ohio

MCGEOCH, JOHN A. *The Psychology of Human Learning.* New York: Longmans, Green and Co., 1942. xvii + 633 pp.

This text, as is indicated in an introduction by Professor Harvey A. Carr, grew out of the preparation for what was to have been a more comprehensive two-volume work. It is sufficiently comprehensive, in itself, that a review can scarcely touch upon the wide range of subject matter covered. It may be said, however, that most of the more or less traditional types of learning experiments and most of the subheadings under learning and memory are discussed. Conditioning, as such, is touched upon but lightly, and the neurology of learning scarcely at all.

The book might be characterized as experimental and factual rather than theoretical and critical, in that the emphasis is upon experimental results. Theories and hypotheses, however, find their place in the book, indeed are mentioned frequently, and at times evaluated in terms of current status if not in terms of probable ultimate truth.

The work is thoroughly documented in that it consists largely of a description of the work of investigators who are identified by name and reference in the text itself rather than by footnotes or notes at the end of the book. Footnotes, used in moderation, contain chiefly supplementary or explanatory material. Bibliographies are given at the end of the chapters. The Author Index gives the names of nearly 700 writers to whose work reference is made, with from one to several dozen (in the case of Thorndike 83) references per name.

Although there are several books available devoted to learning, there was need for such a book as this. Unlike certain of the books on learning, it is not the sort of useful but elementary text that one might use for a beginning course in educational psychology. Unlike others, perhaps equally meritorious in their way, it is not primarily a vehicle by means of which the author presents his own system or theories. It is, rather, a fairly comprehensive and thoroughly up-to-date treatment of those topics which are usually subsumed under the headings of learning and memory. It will be found to be, this reviewer predicts, an extremely suitable textbook for courses in learning on a moderately advanced level. It is like-

wise the sort of book the recent graduate student will wish he might have had available while preparing for his doctoral examinations. It is only to be regretted that the author did not live to complete the larger work.

AMOS C. ANDERSON
Ohio University

Civilian Morale (Second Yearbook of Society for Psychological Study of Social Issues). GOODWIN WATSON, Ed. Published for Reynal and Hitchcock by Houghton Mifflin Co., New York, 1942.

This volume is in five parts as follows: Part one, five chapters, *Theory of Morale;* Part two, five chapters, *How Morale Develops;* Part three, five chapters, *The State of American Morale;* Part four, three chapters, *Morale in Industry;* and Part five, one chapter, *Recommendations.*

Under *Theory of Morale,* Gordon Allport writes the first chapter on the *Nature of Democratic Morale.* He claims that morale "has to do with individual attitude in a group endeavor." The three ingredients, suggested by Allport, necessary for morale is that the individual must have "a solid set of convictions and values," "a task to perform," and "a plan to see it through." In times of peace, harmony must exist between the values and aims of the individual and those of his group. Take these ingredients and brew them in a reference frame of Jeffersonian democracy in which the elements of freedom, representative government, respect for the individual, and some Christian ethics and you have the essence of American morale. Further, this author makes some pointed comparisons between morale under democracy and under totalitarianism. Morale in a democracy stands out favorably in the comparison.

Thomas M. French writes chapter two in Part one. His topic is "The Psychodynamic Problem of Democracy." The thesis is that rebellion against despotism is not sufficient to explain self-government. That self-government involves self-restraint; and self-restraint had to be learned before self-government worked. Some people in the evolution of civilization learn to make concessions to others and not practice cruelty upon them. In other words, motives other than dominance need satisfaction. These can best be secured by cooperation.

Chapter three in Part one grew out of a round table discussion on *the psychological basis of national morale* held at the A.P.A. meeting at Evanston, Illinois, in September, 1941. Goodwin Watson wrote the conclusions of this discussion. Five factors were agreed upon by the men present. A definite goal must be set; a feeling of *togetherness* must be present; morale is favored by the awareness of danger; each member of the group must be given something to do; and lastly, the group must *sense* or feel that it is advancing toward the goal.

Kurt Lewin next writes on *time perspective and morale.* This discussion is really about *hope* or *anticipation.* The author states that the life

space of an individual consists of the *present, past,* and *future.* Here the level of aspiration in relation to achievement is discussed. The immediate goal achieved, the next goal then invites the individual on. In this way *sticking to successive tasks* is maintained. Groups are influenced by *time perspective* as well as individuals.

Gregory Bateson ends Part one with a chapter on *morale and national character.* After warning against barriers that one encounters while concepts of national character are considered, this writer then examines the concepts of *uniformity, regularity,* and *differentiation* of behavior. He discusses our bi-polar dimensions as *dominance, submission, succoring-dependence* as forms of differentiation. Some cultures are binary. Ours falls into Republican-Democratic, Rightist-Leftist. The British have ternary systems such as kings—ministers—people, parents-nurse-child. Extending those concepts to nations, he reaches the heart of his thesis in symmetrical motifs. A differentiation is found in some cultures which he calls *complementary patterns;* in others is found *competitive patterns.* In complementary striving the stimulus to arouse groups to greater effort is the weakness of the opposing group. This is the bully-coward effect. In British and American culture the stimulus to spur us on is strength, not weakness of opponent. In this way we keep "fair play" as the code. This is an interesting thesis.

In Part two, chapter one, Lois Barclay Murphy shows how important are children to morale. Her thesis is that future adult difficulties lie in the basic experiences of children to-day. The author suggests how certain childhood hazards may be avoided. She offers a plea to extend certain services as health, nutrition, and mental hygiene of children.

Ronald Lippitt discusses *youth groups* in relation to morale. Here are summarized some of the data of studies of children and young people who have been studied under authoritarian, laissez-faire, and democratic conditions. This author pleads for more democratic education in classrooms and clubs of youth groups.

Alex Bavelas writes on *morale and training of leaders.* The importance of leadership in a democracy is stressed. The author reviews the few studies bearing on this topic, many of which were done at Iowa University. Morale is not something added to certain groups and not to others. It is a part of the very essence of the behavior of those who have it. Personality, while important, should not be over-valued. Competence, goals, intelligent planning, etc., are important.

S. S. Sargent writes on *propaganda and morale.* This author confuses propaganda with education, or else the reviewer is confused. He defines propaganda as "essentially . . . an attempt to bring about desired attitudes by means of suggestions." Further, selection, evaluation, and interpretation of news is an important function of propaganda. News reporting *per se* come under another category. The reviewer sees no

reason why propaganda should be made so inclusive as to become practically synonymous with education. The term *education* has a longer and more respectable meaning.

Theodore Newcomb writes on what he calls an experiment in news and morale. His problem was "What is the effect of good news or bad news on American public opinion?" The data were obtained from college students in a class of public opinion and propaganda. The results, intended to answer questions about student attitude toward pre-war aid to Britain and our participation in war, were too meager to suggest conclusions in the reviewer's judgment.

Donald Rugg writes the final chapter in Part three on *American morale when the war began.* Per cent curves are given showing the rise and fall of the hopes of the American people regarding the defeat of the axis by the British. Hitler attempted to gain sympathy from us in waging a war against communism in Russia. A large majority of Americans wanted the axis defeated, yet they did not want the United States drawn into the war. The suddenness and the manner of attack by Japan on Pearl Harbor changed our attitude toward participation. Americans wanted England to win without our becoming combatants, but by 1941 their attitude had reached the point where, if necessary, we would wage war. Morale all along was influenced by the leadership. In some cases the morale was confused by domestic issues.

Joe and Eugenia Belden write the next chapter on *student morale.* They claim students were skeptical about war. Many felt that the World War had been futile. Many wanted to feel that their country was a world leader but were not ready to assume the responsibility that went with that leadership. After Pearl Harbor students changed their attitudes. They were and are determined to see the job done.

Otto Klineberg states in his chapter on *morale and the Jewish minority* that unity of all groups is necessary. He discusses the problem of civilian morale from the following viewpoints: To what extent is there anti-Semitism in the United States, and in what ways does it threaten national unity? What are the prospects regarding the future of the Jews? How do these conditions affect the Jews themselves? He cites instances to show that there has always been some prejudice against the Jews and that this prejudice constitutes a threat to unity. He pleads for more democracy in every aspect.

Kenneth B. Clark writes on *morale among the negroes.* Clark claims that negroes feel a frustration which is complicated by resentment toward the lack of democracy influencing their lives. Particular attention is given to what the author considers the South's disregard of the Bill of Rights while dealing with the negro. The author has hope that morale of the negro can be worked out in the framework of our culture so that democracy will truly be had for all.

J. D. Ketchum and J. S. A. Bois write on *morale in Canada.* The former writer discusses morale in general for Canada, while the latter writes on the peculiar aspects of French Canadian morale.

Ketchum states that there is not the glamour over this war as there was about the last—yet that morale of the Canadians is good. The Canadians are better educated to-day; also, the United States' influence is greater; propaganda does not work well to-day. People want the facts.

Bois states that the French Canadian morale is not as good as it is in other parts of Canada. French Canadians do not have a sufficient voice in government. The French Canadians do not want British leadership; while they do not want the British to lose, they wouldn't mind her getting a whipping.

Part four begins with a chapter on *morale during unemployment* written by Goodwin Watson. Data from *Adjustment Service* established in New York City during and following the depression furnish insight for the author's analysis of his aspects of unemployment morale as follows: one is the condition of physical and emotional well-being of the worker; the other emphasizes the group, its purposes, its leaders, and the individual's integration into this group of unemployed. From Hall's occupational morale scale and the Life-satisfaction battery, the data gathered indicate that men with high morale had somehow, in spite of adverse conditions, sustained a faith in *ambition* and *individual initiative* in order to succeed; men wth low morale accepted the atttiude that individual effort no longer counts. Watson's hypothesis, deduced from analysis of aspects of the morale of the unemployed, suggests that certain personality factors such as emotional security in childhood, past successes and failures, ability, and other conditions, as being married with a family, one's educational status, religion and others, influence morale of unemployment.

Richard L. Hull and Arthur Kolstad analyze *morale of people on the job.* This chapter is about techniques for measuring employee morale and the conclusions which some studies show about morale. For morale to be present in the worker, the employer must respect the individual worker. Morale is related to the quality of foremen and supervisors who deal directly with the worker. The authors state that business has paid too little attention to morale as a personnel problem.

Goodwin Watson writes a chapter in this Part on *labor unions and morale.* He states "one index of morale may be found in output figures —another in voluntary quits." After enumerating many ways in which managers may aid or hinder morale, and how growing fears of unemployment after the war influence the worker today, and the role unions play in collective bargaining he then examines labor unions in relation to the general public in the maintenance of morale. The following four steps are suggested in aiding morale. 1, To insure fair statements of labor unions by publicity agencies; 2, To require unions to extend democracy

within themselves; 3, To better control profits, prices and wages so all will share equally; 4, To dissuade anti-labor groups from extreme viewpoints.

Part five consists of one chapter and is written in the form of a recommendation by Gardner Murphy. These recommendations are assumed to be essential for civilian morale in keeping with Jeffersonian democracy. Murphy suggests we keep this tradition and to give it the forms that this brand of democracy should use. The writer mentions the obstacles retarding morale and discusses ways of overcoming them. Some suggestions are made regarding health as a morale sustainer. Some techniques that are in use as morale promoters are discussed. Lastly, he suggests research that should be made in morale in order that we may have light to evolve guiding principles in our democracy.

This is a stimulating book. Much of what is said is speculation while some of the statements are documented with what evidence there is available. The contribution lies in the motivation to get some kind of order out of a field that is fertile but unplowed.

JAMES R. PATRICK
Ohio University

TOLMAN, EDWARD CHANCE. *Drives Toward War.* D. Appleton-Century Co., New York, 1942.

"As an American, a college professor, and one brought up in the pacifist tradition, I am intensely biased against war. It is for me stupid, interrupting, unnecessary, and unimaginably horrible. I write this essay within that frame of reference. In short, I am driven to discuss the psychology of war and its possible abolition because I want intensely to get rid of it.

"The argument which follows will be over simple. . . . I shall treat eras and nations as if all the individuals in them enjoyed homogeneous motivational patterns. Such is certainly not the case. . . .

"Further, I shall rush in where angels fear to tread. . . . I as a mere psychologist will adapt concepts derived from behavior of rats and chimpanzees, combine them with certain Freudian notions, and then attempt to apply the result to the most central and the most grievous problems of human society. But perhaps the times are such that any sincere attempt, however bizarre, to throw further light upon our present darkness is to be accepted."

According to Drucker, Western Europe has since the beginning of Christianity been dominated by some four concepts as to the ways in which individual happiness and welfare are to be sought. Each of these concepts held up a certain type of man, or ideal, which if only followed, would lead, *ipso facto*, to happiness. These myths are the Spiritual Man, Intellectual Man, Economic Man, and Heroic Man. The author hopes

that the time is right for a fifth myth to appear. "I shall call it the myth of the Psychologically Adjusted Man, the concept that only when man's total psychology is understood and all his absolutely necessary psychological needs are allowed balanced satisfaction, will a society permitting relatively universal happiness and welfare be achieved and war be abolished. Man's entire psychological nature must be understood if general happiness and welfare are to result."

A bird's-eye view of the book is given in the table of contents: Psychologically Adjusted Man; The Biological Drives; The Social Techniques; Heredity, Learning and the Psychological Dynamisms; Drive-Conversions; Psychologically Adjusted Man and the Abolition of War.

Because of their similarity to the long lists of instincts found in most books on psychology twenty-five years ago, the biological drives and the social techniques are listed:

The Biological Drives

A. The appetites
   - Hunger
   - Thirst
   - Sex
   - Maternal
   - Nurturance
   - Infantile dependence
   - Nest-building
   - General activity
   - Curiosity
   - Rest or sleep
   - Elimination
   - Play and aesthetics

B. The Aversions
   - Fright (injury-avoidance)
   - Aggression (obstruction-avoidance)
   - Gregariousness (isolation-avoidance)

The Social Techniques

A. Self-Assertive
   1. Establishing dominance status
   2. Competitive acquisition
   3. Demanding and soliciting food
   4. Succorance

B. Self-Abasive
   1. Submitting
   2. Giving

C. Collective
   1. Imitation
   2. Mutual help and assistance
   3. Cooperative work

D. Collective-Assertive
   1. Loyalty to group

Each of the appetites is set in motion by some peculiar internal metabolic condition, which occurs in more or less regular cycles. This condition drives the organism till an appropriate consummatory object is reached, where a defining consummatory response can occur, bringing satiation.

Each of the aversions is set going by a certain type of external situation, which produces a certain characteristic type of internal suffrance; this, in turn, keeps the organism active until a new environmental situation is achieved which removes either the actual suffrance or the threat of it.

The appetites plus the aversions "provide the ultimate and basic needs for all animals, human and subhuman."

In addition there are in the higher animals "certain relatively universal forms of social drive, or *social technique*, which tend to subserve the biological drives." These drives, "although in part acquired as a result of special training, also seem to have considerable innate bases."

The social techniques are supported by observations of hens, monkeys and chimpanzees under and out of experimental control.

A basic assumption is that the drives and techniques of lower animals are present in man. And man's complex environment, heating system, clothes, religion, airplanes and bombs are complicated outgrowths of these drives and techniques. The key problem is to discover what factors determine in man the relative strengths of the different groups of drives and techniques, that is, something about the relative influences of *heredity*, of *learning*, and the *psychological dynamisms*, as modifiers of such drives and techniques.

Since there is no controlled evidence of the relative importance of heredity, "we must suppose that the biological drives and all the four types of social techniques are all rooted, to some degree, in the 'instinct.'" It is also assumed that hereditary factors affect the relative strengths of the various drives and techniques; "but we also assume that these innate factors play a relatively minor role, save in the case of the biological drives, and that the effects of given environmental pressures are much greater."

Learning is the discovery that a given type of behavior is instrumental to the satisfaction of the fundamental drives; thus the results of learning are closely dependent upon environmental conditions.

The psychological (Freud's) dynamisms are less "reasonable" than learning and are relatively blind. Only nine of the more important ones are considered:

Fixation	Introjection	Identification with parent
Repression	Symbolization	Identification with group
Reaction-formation	Displacement	Projection

The relationship of the drives and the dynamisms may be shown somewhat as follows: the biological drives (when frustrated) provide the basic energy, and give rise, through the processes of learning and fixation either to the self-assertive or the collective techniques. If the collective technique is tried and found satisfactory, identification with the group follows, which leads to collective-assertive techniques (characterized by loyalty to the group). Further learning leads to aggression against attacking enemies of the group (war). If, on the other hand, the frustrated biological drive through learning and fixation leads to self-assertive tech-

niques, one may by learning and repression, derive self-abasive techniques plus repressed hostility. Then, by means of displacement, arises aggression against inferiors, or by means of identification with group plus projection, arises aggression against outsiders. For example, dammed-up hostility against a parent or superior "may, through the dynamisms of 'identification with the group,' and of 'projection' onto others, be converted primarily into hostile behavior toward 'outsiders' with the accompanying feeling (due to the projection) that it is the latter, the outsiders, who are the really guilty ones. This is the set up in what I would call *neurotically motivated war.*" The evidence is all around, "most definitely in the Nazis and the Japanese."

"A truly stable and happy society would be brought about if we could but embody in that society the following six prescriptive principles: biologic needs are basic and must be satisfied; self-assertive and collective techniques are useful and necessary; self-abasive techniques are bad; good identifications with parent or other accepted authorities should be encouraged (Hitler identify self with Napoleon?); group loyalties must be directed; direct group loyalties into policing recalcitrant sub-groups and subduing Nature. We may need in this Utopia much more of socialism than we have had; the child must be aided in finding the appropriate models to copy and identify with; the group would perhaps be supranational, a World Federation."

Some questions come to mind: if the dynamisms have played such a prominent role in bringing about present conditions, how can we be assured that they can be thrown in reverse? Will a knowledge of psychological principles bring about a uniform desire for the same goals in education and government? If the principles taught by Jesus could not be lived up to and tested, except in a few individuals, how would a knowledge of psychological principles assure group adherence to these principles? (Hasn't Goering a Ph.D. in Psychology?)

The author has done a splendid job of focusing attention upon the dynamics of behavior, and of untangling their relationships. The myth of the Psychologically Adjusted Man is still a myth.

As usual, the author has written clearly and not too technically for an intelligent layman.

J. R. GENTRY,
Ohio University

ROGERS, CARL R. *Counseling and Psychotherapy.* Houghton Mifflin Co., 1942. Pp. XIV + 450.

In many psychological clinics, the emphasis is on the analysis of the individual and the diagnosis of his condition. Relatively little attention is given to treatment of the case. The point of view presented in this book is that helping the individual to solve his problems is more important than obtaining an accurate diagnostic picture of the individual.

Many persons have been eager to learn about the principles and techniques of psychotherapy which Dr. Rogers has been teaching and using. This book does not attempt to present all viewpoints in the field of psychotherapy. It deals primarily with explaining and illustrating the principles and techniques of non-directive therapy. Counseling is presented as a "knowable, predictable, understandable process, a process that can be learned, tested, refined, and improved."

Non-directive therapy involves simple recognition and clarification of feelings expressed by the client as opposed to directive questioning and the giving of advice. The aim is not to solve the problems for the client but to enable the client to develop to the place where he can solve his own problems as they arise. The type of therapy described here is not proposed as suitable for all kinds of problems. Tentative criteria are proposed for determining when it is advisable to undertake non-directive therapy. Practical questions regarding the counseling relationship are answered in a straight-forward and helpful manner.

A unique and extremely helpful section of the book is a verbatim recording of a complete series of treatment interviews. The Herbert Bryan case is selected from several similar ones treated by Dr. Rogers and his co-workers. An analysis of the phonographically-recorded case material seems to verify many of the principles of therapy set forth earlier in the book. The annotated case contains examples of both correct and incorrect responses and provides excellent illustrative material for the training of counselors.

This book may well be of revolutionary significance in the clinical field. It should do much to make therapy a definitive process, and one that can be studied by standard research procedures. Despite Dr. Rogers' contribution, adequate criteria of the well-adjusted individual and techniques for measuring adjustment remain barriers to any thorough research program in the field of therapy. No one who reads this book, including the Herbert Bryan case, will doubt that this book will be of real value to the student, the clinician, and the research worker. In the opinion of the reviewer, this is the most important book to appear in the clinical field in many years.

CHARLES C. GIBBONS,
Owens-Illinois Glass Company,
Toledo, Ohio

NEW BOOKS AND PAMPHLETS

Books and pamphlets for review should be sent to Willard L. Valentine, Business Manager of the Publications of the American Psychological Association, Inc., Northwestern University, Evanston, Illinois.

Boletin do Servico Social dos Menores. EDGAR SHALDERS, Director. Departamento de Servico Social, Sao Paulo, Brazil. 88 pp.

Bureau of Child Study and the Chicago Adjustment Service Plan. Reprinted from the Annual Report of the Superintendent of Schools, 1940–41. Board of Education, Chicago, Illinois. 150 pp.

Counseling and Psychotherapy. CARL R. ROGERS. Houghton Mifflin Company, Boston, 1942. $3.60. 450 pp.

Glimpses into Child Life. ROSE ZELIGS. William Morrow & Company, New York, 1942. $3.00. 442 pp.

Mental Illness: A Guide for the Family. EDITH M. STERN. The Commonwealth Fund, New York, 1942. $1.00. 134 pp.

Pioneering in Psychology. CARL E. SEASHORE. University of Iowa Press, Iowa City, Iowa, 1942. 232 pp.

Reading as a Visual Task. MATTHEW LUCKIESH AND FRANK K. MOSS. D. Van Nostrand Company, New York, 1942. $5.00. 428 pp.

Some Aspects of the Effect of the Dominant American Culture upon Children of Italian-born Parents. JOSEPH WILFRID TAIT. Bureau of Publications, Teachers College, Columbia University, 1942. $1.60. 74 pp.

The Subnormal Adolescent Girl. THEODORA M. ABEL AND ELAINE F. KINDER. Columbia University Press, New York, 1942. $2.50. 215 pp.

Understanding Myself. ROY E. DICKERSON. Association Press, New York, 1942. $2.00. 180 pp.

War Without Inflation. GEORGE KATONA. Columbia University Press, New York, 1942. $2.50. 213 pp.

INDEX OF SUBJECTS

Titles of books are followed by the name of the author of the work reviewed. All other references are to original articles.

Abilities, professional schools, motor, mechanical, 24.

Ability-group scoring keys, interest scores, selection, salesmen, servicemen, occupational vs, 543; —— ratings, transcribed voices, salesmen, relationship, sales, 499; ——, superior negro children, study, social background, music, 210.

Achievement, aptitude study, interest patterns, successful, unsuccessful home economics students, entering college, 738.

Activity, rural community role, reading, life, 530.

Adams-Lepley personal audit, Bernreuter personality inventory, study, interrelationships, 338.

Adult applicants, public employment office, manipulative performance, young, 633; —— males, Minnesota paper form board test, O'Rourke mechanical aptitude test, performance, 809.

Age, test performance, applicants, technical-industrial high school, relationship, 482.

Agents, use, Strong vocational interest blank, Pressey senior classification test, selection, casualty insurance, 793.

Alcohol intoxication changes, color fields occasioned, experimentally induced, 692.

Alpha test scores, bank clerks, comparison, Otis, 850.

Analyzer, mechanical device, treating, fourfold, table large samples, item, 511.

Analysis, effectiveness, deodorant creams, experimental, statistical, 308. ——, Kent oral emergency test, clinical instrument, examination, naval recruits, qualitative, 316.

Angle board, diagnosing handedness, validity, reliability, Van Ripper critical, 352.

Anniversary, Psychological Corporation, honor founder Cattell, 8.

Answer sheets, one run, IBM test scoring machine, procedure, six part scores, 653.

Anxiety scale, development, 187.

Applicants, public employment office, manipulative performance, young adult, 633; ——, technical-industrial high school, relationship, age, test performance, 482; ——, testing clerical, 852.

Aptitude, study, interest patterns, successful, unsuccessful home economics students entering college, similar achievement, 738; ——, superior negro children, study, social background, are, 777; —— test, performance, adult males, Minnesota paper form board test, O'Rourke mechanical, 809.

Art aptitude, superior negro children, study, social back ground, 777.
Arts students, comparison, interests, personality traits, engineers, liberal, 721.
Attitude, subjective correlates, sleep quality, relation, euphoric, 487.
Auditory, visual stimuli, errors, perceiving, temporal order, 382.
Awareness, genesis, brand, 800.
Axis propaganda, penetration, 448.

Bank clerks, comparison, Otis, Alpha test scores, 850.
Bernreuter personality inventory, study, interrelationships, Adams-Lepley personal audit, 338.
Blindness, effect, changes, Vitamin A content, diet, recovery, glare, 359.
Books, selected, 100 qualified persons, 100 greatest, 257.
Brand awareness, genesis, 800.

Cards, test results, profile form, plan, punched, 94.
Casualty insurance agents, use, Strong vocational interest blank, Pressey senior classification test, selection, 793.
Cattell, contribution, 20th anniversary, Psychological Corporation, honor, founder, 8.
Characteristics, comparison, fraternity, non-fraternity populations, personality, 50.
Children, comparison, revised Stanford-Binet, Form L, Kuhlmann tests, mental development, performances, mentally defective, 159; ——, study, social background, music ability, superior negro, 210; ——, study, social background, art aptitude, superior negro, 777.
Circulation, method determining number, readers per copy, magazine, 477.
Civilian Morale (Watson, editor), 864.
Classification test, Purdue industrial training 770; —— test, selection, casualty insurance agents, use Strong vocational interest blank, Pressey senior, 793.
Clerical applicants, testing, 852; ——, battery, United States employment service, comparison, Minnesota vocational test, clerical workers, general, 75; —— workers, general clerical battery, United States employment service, comparison, Minnesota vocational test, 75.
Clerks, comparison, Otis, Alpha test scores, bank, 850.
Clinical instrument, examination, naval recruits, qualitative analysis, Kent oral emergency test, 316.
College freshmen, parental occupation, intelligence, Jewish, 659; ——, similar achievement, aptitude, study, interest patterns, successful, unsuccessful home economics students entering, 738.
Color fields, experimentally induced alcohol intoxication, changes, 692.
Community role, reading, life activity, rural, 530.

Component parts, estimating, minimal reliability, total test, intercorrelations, standard deviation, 332.
Consumer surveys, public opinion, 10.
Coordination test, learning, two-hand, 41.
Copy, magazine circulation, method determining number, readers, per, 477.
Correlates, sleep quality, relation, euphoric attitude, subjective, 487.
Counseling and psychotherapy (Rogers), 872.
Courses, psychological tests, selection, enrollees, engineering, science, management, defense training, 584.
Creams, experimental, statistical analysis, effectiveness, deodorant, 308.

Deception, ocular stability, 55.
Defective children, comparison, revised Stanford-Binet, Form L, Kuhlmann tests, mental development, 159.
Defense training courses, psychological tests, selection, enrollees, engineering, science, management, 584.
Deodorant creams, experimental, statistical analysis, effectiveness, 308.
Development, mental fatigue, levels, intelligence, homogeneity, difficulty, 81.
Deviations, component parts, estimating, minimal reliability, total tests, intercorrelations, standard, 332.
Dexterity, R–G pegboard test, finger, 523.
Diagnosing handedness, validity, reliability, Van Ripper critical angle board, 352.
Diet, recovery, glare blindness, effect, changes, Vitamin A content, 359.
Differences, understanding mechanical problems, sex, 121.
Dreams, gastric hunger movements, man, effect, normal, hypnotically induced, 682.
Drives toward war (Tolman), 868.

Economic status, high school girls, vocational wishes, expectations, relationship, 399.
Economy, workers' reactions, industrial problems war, 416.
Efficiency, textile inspectors, comparison, visual factors, 812.
Employment office, manipulative performance, young adult applicants, public, 633, 754; —— procedure, effect, specialized industrial norms, use, Minnesota rate, manipulation test, selective instrument, 785; —— service, comparison, Minnesota vocational test, clerical workers, general clerical battery, United States, 75.
Engineering, science, management, defense training courses, psychological tests, selection, enrollees, 584.
Engineers, liberal arts, students, comparison, interests, personality traits, 721.
Enrollees, engineering, science, management, defense training courses, psychological tests, selection, 584.
Estimated interests, validity, self-, 606.

Euphoric attitude, subjective, correlates, sleep quality, relation, 487.
Examination, naval recruits, qualitative analysis, Kent oral emergency test, clinical instrument, 316.
Expectations, relationship, economic status, high school girls' vocational wishes, 399.
Experimentally induced alcohol intoxication, changes, color fields occasioned, 692.
Eye movement, influence, size-type, 227.

Factor analysis to 1942 (Wolfle), 111.
Fatigue, levels, intelligence, importance, homogeneity, difficulty, development, mental, 81.
Finger dexterity, R–G pegboard test, 523.
Form board test, O'Rourke mechanical aptitude test, performance, adult males, Minnesota paper, 809.
Formulae, modified type, multiple-choice question, scoring, 702.
Four fold table, large samples, item analyzer, mechanical device, treating, 511.
Fraternity, non-fraternity populations, personality characteristics, comparison, 50.
Freshmen, parental occupation, intelligence, Jewish college, 659.
Fundamentals of industrial psychology (Walton), 395.

Gastric hunger movements, man, effect, normal, hypnotically induced dreams, 682.
General clerical battery, United States employment service, comparison, Minnesota vocational test, clerical workers, 75.
Girls, stated vocational aims, Strong interest test scores, high school senior, 64.
Girls' vocational wishes, expectations, relationship, economic status, high school, 399.
Glare blindness, effect, changes, Vitamin A content, diet, recovery, 359.
Group-administered performance test products, code numbers, means, scoring, 136.
Group scoring keys, interest scores, selection, salesmen, servicemen, occupational vs. ability, 543.
Guidance, follow-up, vocational, 285.

Handedness, validity, reliability, Van Ripper, critical angle board, diagnosing, 352.
High school senior girls, stated vocational aims, Strong interest test scores, 64; —— students, note, 20-minute time limit, Otis S–A tests, superior, 241.
Home economics students entering college, similar achievement, aptitude, study interest patterns, successful, unsuccessful, 738.
Homogeneity, difficulty, development, mental fatigue, levels, intelligence, importance, 81.
Hunger movements, man, effect, normal, hypnotically induced dreams, gastric, 682.
Hygiene, learning, mental, 268.
Hypnotically induced dreams, gastric hunger movements, man, effect, normal, 682.

IBM test scoring machine, procedure, obtaining six part scores, answer sheets, one run, 653.
Individual, psychology, 21.
Industrial high school, relationship, age, test performance, applicants, technical-, 482; —— norms, use, Minnesota rate, manipulation test, selective instrument, employment procedure, effect, specialized, 785; —— problems, war economy, workers' reactions, 416; —— training, classification test, Purdue, 770.
Industrial psychology (Tiffin), 862.
Inspector-packers, test, selection, 468.
Inspectors, comparison, visual factors, efficiency, textile, 812.
Insurance agents, use, Strong vocational interest blank, Pressey senior classification test, selection, casualty, 793.
Intelligence, importance, homogeneity, difficulty, development, mental fatigue, levels, 81; ——, patients, sanatorium, comparison, occupational ranking, interests, education, 218; ——, two screening tests, verbal, 128.
Intercorrelations, standard deviation, component parts, estimating, minimal reliability, total test, 332.
Interest blank, Pressey senior classification test, selection, casualty insurance agents, use, Strong vocational, 793; —— patterns, successful, unsuccessful home economics students entering college, similar achievement, aptitude study, 738; —— test scores, high school senior girls, stated vocational aims, Strong, 64; ——, education, intelligence, patients, sanatorium, comparison, occupational ranking, 218.
Interests, personality traits, engineers, liberal arts students, comparison, 721; ——, validity, self-estimated, 606.
International reconstruction, psychological aspects, 439.
Interrelationships, Adams-Lepley personal audit, Bernreuter personality inventory study, 338.
Intoxication, changes, color fields, occasioned, experimentally induced alcohol, 692.
Inventory, study, interrelationships, Adam-Lepley personal audit, Bernreuter personality, 338.
Item validity, note, value, customary measures, 625.
Items, nomograph, estimating, validity, test, 846; ——, weighting merit rating, 575.

Jewish college freshmen, parental occupation, intelligence, 659.
Jews, non-Jews, traits, personality, comparison, 828.
Jobs, released prisoners, wanted, 563.

Kent oral emergency test, clinical instrument, examination, naval recruits, qualitative analysis, 316.
Keys, interest scores, selection, salesmen, servicemen, occupational vs. ability-group scoring, 543.
Kimber study skills test, evaluation, Tyler-, 594.

Kuhlmann tests, mental ability, performances, mentally defective children, comparison, revised Stanford-Binet, 159.

Learning, mental hygiene, 268.
Levels, intelligence, importance, homogeneity, difficulty, development, mental fatigue, 81.
Liberal arts students, comparison, interests, personality traits, engineers, 721.
Life activity, rural community, role, reading, 530.
Luria method, study, 168.

Machine, procedure, obtaining six part scores, answer sheets, one run, IBM test scoring, 653.
Magazine circulation, method, determining number, readers, per copy, 477.
Males, Minnesota paper form board test, O'Rourke mechanical aptitude test, performance, adult, 809.
Man, effect, normal, hypnotically induced dreams, gastric hunger movements, 682.
Management, defense training courses, psychological tests, selection, enrollees, engineering, science, 584.
Management and Morale. (Roethlisberger), 395.
Manipulation test, selective instrument, employment procedure, effect, specialized industrial norms, use, Minnesota rate, 785.
Measures, item validity, note, value, customary, 625.
Mechanical abilities, professional schools, motor, 24; —— aptitude test, performance, adult males, Minnesota paper form board test, O'Rourke, 809; —— device, treating, four fold table, large samples, item analyzer, 511; —— problems, sex differences, understanding, 121.
Mechanics, interest test, route salesmen, 669.
Mental development, performances, mentally defective children, comparison, revised Stanford-Binet, Kuhlmann tests, 159; —— fatigue, levels, intelligence, importance, homogeneity, difficulty, development, 81.
Mentally defective children, comparison, revised Stanford-Binet, Form L, Kuhlmann tests, mental development, performances, 159.
Merit rating items, weighting, 575.
Methods of correlation analysis (Ezekiel), 112.
Military training, how psychology, facilitate, 3.
Minnesota paper form board test, O'Rourke mechanical aptitude test, performance, adult males, 809; —— psychasthenia, multiphasic personality schedule, 614; —— rate, manipulation test, selective instrument, employment procedure, effect, specialized industrial norms, use, 785; ——, study, sophomore testing, University, 296, 456, 587; —— vocational test, clerical workers, general clerical battery, United States employment service, comparison, 75.
Motivation and visual factors; individual studies of college students (Bender, Inus, Rothney, Kempel, England), 393.
Movements, man effect, normal,

hypnotically induced dreams, gastric hunger, 682.
Multiple-choice question, scoring formulae, modified type, 702.
Music ability, superior negro children, study, social background, 210.

Naval recruits, qualitative analysis, Kent oral emergency test, clinical instrument, examination, 316.
Negro children, study, social background, art aptitude, superior, 777; —— children, study social background, music ability, superior, 210.
Non-Jews, respect, traits, personality, comparison, Jews, 828.
Normal, hypnotically induced dreams, gastric hunger movements, man, effect, 682.
Norms, use, Minnesota rate, manipulation test, selective instrument, employment procedure, effect, specialized industrial, 785.

Occupation, intelligence, Jewish college freshmen, parental, 659.
Occupational ranking, interests, education, intelligence, patients, sanatorium, comparison, 218; —— vs. ability-group scoring keys, interest scores, selection, salesmen, servicemen, 543.
Office, manipulative performance, young adult applicants, public employment, 633, 754.
Opinion, consumer surveys, public, 10.
Oral emergency test, clinical instrument, examination, naval recruits, qualitative analysis, Kent, 316.
O'Rourke mechanical aptitude tests, performance, adult males, Minnesota paper form board, 809.
Otis, Alpha test scores, bank clerks, 850; —— S–A tests, used, superior high school student, note, 241.

Packers, tests, selection, inspectors, 468.
Paper form board test, O'Rourke mechanical aptitude test performance, adult males, Minnesota, 809.
Parental occupation, intelligence, Jewish college freshmen, 659.
Patients, sanatorium, comparison, occupational ranking, interests, education, intelligence, 218.
Pegboard test, finger dexterity, R–G, 523.
Perceiving temporal order, auditory, visual stimuli, errors, 382.
Performance test products, code numbers, means, scoring group-administered, 136; ——, young adult applicants, public employment office, manipulation, 633, 754.
Personal audit, Bernreuter personality inventory, study, interrelationships, Adams-Lepley, 338.
Personality characteristics, comparison, fraternity, non-fraternity populations, 50; ——, comparison, Jews, non-Jews, respect, traits, 828; —— inventory, study, interrelationships, Adams-Lepley personal audit, Bernreuter, 338; —— schedule, Minnesota, psychasthenia, multiphasic, 614; —— traits, engineers, liberal arts students, comparison, interests, 721.

Personnel, industrial psychology, 17.
Populations, personality characteristics, comparison, fraternity, non-fraternity, 50.
Practice, screwdriver work, effect, 197.
Preferences, typography, reader, 38.
Pressey senior classification test, selection, casualty insurance agents, use, Strong vocational interest blank, 793; —— X–O test, improved method, scoring, 841.
Principles of applied psychology (Poffenberger), 859.
Prisoners, wanted, jobs, released, 563.
Problems, sex differences, understanding, mechanical, 121; ——, war economy, workers' reactions, industrial, 416.
Professional schools, motor, mechanical abilities, 24.
Profile form, plan, punched cards, test results, 94.
Program, University, Minnesota, study, sophomore testing, 587.
Propaganda, penetration, axis, 448.
Psychasthenia, multi-basic personality schedule, Minnesota, 614.
Psychological Corporation, founder, Cattell, 20th anniversary, 8; —— Corporation, 1941, report, activities, 151.
Psychology, facilitate military training, how, 3; ——, personnel, industrial, 17.
Psychology of learning (McGeoch), 863.
Psychology of the interview, the (Oldfield), 249.
Public employment office, manipulative performance, young adult applicants, 633; —— speakers, audience tendencies, rating, 371.
Punched cards, test results, profile form, plan, 94.
Purchase questions, last versus usual, 180.

Questions, last versus usual purchase, 180; ——, scoring formulae, modified type, multiple-choice, 702.

Ranking, interests, education, intelligence, patients, sanatorium, comparison, occupational, 218.
Rate, manipulation test, selective instrument, employment procedure, specialized industrial norms, use, Minnesota, 785.
Rating items, weighting, merit, 575; —— public speakers, audience tendencies, 371.
Ratings, transcribed voices, salesmen, relationship, sales, ability, 499.
Reactions, industrial problems, war economy, workers, 416.
Readers per copy, magazine circulation, method, determining number, 477.
Reading, life activity, rural community, role, 530.
Reading of verbal material in ninth grade algebra (McKim), 251.
Reconstruction, psychological aspects, international, 439.
Recruits, qualitative analysis, Kent oral emergency test, clinical instrument, examination, naval, 316.
Released prisoners, wanted, jobs, 563.

Reliability, total test, intercorrelations, standard deviation, component parts, estimating minimal, 332; ——, Van Ripper critical angle board, diagnosing handedness, validity, 352.

Retroactive inhibition (Swenson), 249.

Revised Stanford-Binet, Form L, Kuhlmann tests, mental development, performances, mentally defective children, comparison, 159.

Rural community, role, reading, life activity, 530.

Sales ability, ratings, transcribed voices, salesmen, relationship, 499.

Salesmen, mechanics, interest test, route, 669; ——, relationship, sales ability, ratings, transcribed voices, 499; ——, servicemen, occupational vs. ability-group scoring keys, interest scores, selection, 543.

Sanatorium, comparison, occupational ranking, interests, education, intelligence, patients, 218.

Scale, development, anxiety, 187.

Schedule, Minnesota psychasthenia multiphasic, personality, 614.

School girls, their vocational wishes, expectations, relationship, economic status, high, 399; ——, relationship, age, test performance, applicants, technical industrial high, 482; —— senior girls, stated vocational aims, Strong interest test scores, high, 64; —— student, note, 20-minute time limit, Otis, S–A tests, superior high, 241.

Schools, motor, mechanical abilities, professional, 24.

Science, management, defense training courses, psychological tests, selection, enrollees, engineering, 584.

Scores, answer sheets, one run, IBM test scoring machine, procedure, obtaining six part, 653; ——, bank clerks, comparison, Otis Alpha test, 850; ——, high school senior girls, stated vocational aims, Strong interest test, 64; ——, selection, salesmen, servicemen, occupational vs. ability-group scoring keys, interest, 543.

Scoring group-administered performance test products, code numbers, means 136; —— keys, interest scores, selection, salesmen, servicemen, occupational vs. ability-group, 543; —— machine, procedure, obtaining six part scores, answer sheets, one run, IBM test, 653; ——, Pressey X–O test, improved method, 841.

Screwdriver work, effect, practice, 197.

Selection, casualty insurance agents, use, Strong vocational interest blank, Pressey senior classification test, 793; ——, enrollees, engineering, science, management, defense training courses, psychological tests, 584; ——, inspector-packers, tests, 468; ——, salesmen, servicemen, occupational vs. ability-group scoring keys, interest scores, 543.

Selective, instrument, employment procedure, effect, specialized industrial norms, use, Minnesota rate, manipulation test, 785.

Self-estimated interest, validity, 606.
Senior classification test, selection, casualty insurance agents, use, Strong vocational interest blank, Pressey, 793.
Service, comparison, Minnesota vocational test, clerical workers, general clerical battery, United States employment, 75.
Servicemen, occupational vs. ability-group scoring keys, interest scores, selection, salesmen, 543.
Six part scores, answer sheets, one run, IBM test scoring machine, procedure, 653.
Size, type, eye movements, influence, 227.
Skills test, evaluation, Tyler-Kimber study, 594.
Sleep quality, relation, euphoric attitude, subjective correlates, 487.
Social background, art aptitude, superior negro children, study, 777; —— background, music ability, superior negro children, study, 210.
Sophomore testing, University, Minnesota, study, 296, 456, 587.
Speakers, audience tendencies, rating public, 371.
Stability, deception, ocular, 55.
Standard deviation, component parts, estimating, minimal reliability, total test, intercorrelations, 332.
Stanford-Binet, Form L, Kuhlmann tests, mental development, performances, mentally defective children, comparison, revised, 159.
Statistical analysis, effectiveness, deodorant creams, experimental, 308.
Stimuli, errors, perceiving, temporal order, auditory, visual, 382.
Strong interest test scores, high school senior girls, stated vocational aims, 64; —— vocational interest blank, Pressey senior classification test, selection, casualty insurance agents, use, 793.
Students, comparison, interest, personality traits, engineers, liberal arts, 721; —— entering college, similar achievement, aptitude, study, interest patterns, successful, unsuccessful home economics, 738; ——, note 20-minute time limit, Otis S–A, superior high school, 241.
Study skills test, evaluation, Tyler-Kimber, 594.
Subjective correlates, sleep quality, relation, euphoric attitude, certain, 487.
Surveys, public opinion, consumer, 10.
Symposium on recent advances in psychology (Conklin and others), 113.

Technical-industrial high school, relationship, age, test performance, applicants, 482.
Temporal order, auditory, visual stimuli, errors, perceiving, 382.
Test, clinical instrument, examination, naval recruits, qualitative analysis, Kent oral emergency, 316; ——, clerical workers, general clerical battery, United States employment service, comparison, Minnesota vocational, 75; ——, evaluation, Tyler-Kimber study skills, 594; ——, finger dexterity, R–G pegboard, 523;

——, improved method, scoring, Pressey X–O, 841; ——, intercorrelations among, standard deviations of, component parts, estimating, minimal reliability, total, 332; —— items, nomograph, estimating, validity, 846; ——, learning, two-hand coordination, 41; ——, O'Rourke mechanical performance, adult males, Minnesota paper form board, 809; —— performance, applicants, technical-industrial high school, relationship, age, 482; —— products, code numbers, means, scoring group-administered performance, 136; ——, Purdue industrial training classification, 770; —— results, profile form, plan, punched cards, presenting, 94; ——, route salesmen, mechanics, interest, 669; —— scores, bank clerks, comparison, Otis, Alpha, 850; —— scores, high school senior girls, vocational aims, Strong vocational, 64; —— scoring machine, procedure, obtaining six part scores, answer sheets, one run, IBM, 653; ——, selective instrument, employment procedure, effect, specialized industrial norms, use, Minnesota rate, manipulation, 785; —— selection, casualty insurance agents, use, Strong vocational interest blank, Pressey senior classification, 793; —— superior high school students, note, twenty-minute time limit, Otis S–A, 241.

Testing, University, Minnesota study, sophomore, 296, 456, 587.

Tests, mental development, performances, mentally defective children, comparison, revised Stanford-Binet, Kuhlmann, 159; ——, selection, enrollees, engineering, science, management, defense training courses, psychological, 584; ——, verbal intelligence, two screening, 128.

Textile inspectors, comparison, visual factors, efficiency, 812.

Time limit, Otis S–A tests, superior high school students, note, twenty-minute, 241.

Training, classification test, Purdue industrial, 770; —— courses, psychological tests, selection, enrollees, engineering, science, management, defense, 584; —— how psychology, facilitate military, 3.

Traits, engineers, liberal arts students, comparison, interests, personality, 721; ——, personality, comparison, Jews, non-Jews, several, 828.

Transcribed voices, salesmen, relationship, sales ability, ratings, 499.

Two-hand coordination test, learning, 41.

Tyler-Kimber study skills, test, evaluation, 594.

Type, eye movement, influence, size, 227.

Typography, reader preferences, 38.

United States, comparison, Minnesota vocational test, clerical workers, general clerical battery, 75.

University, Minnesota study, sophomore testing, 296, 456, 587.

Validity, note, value, customary measures, item, 625; ——, test items, nomograph, estimating, 846.
Value, customary measures, item validity, note, 625.
Van Ripper critical angle board, diagnosing handedness, validity, reliability, 352.
Verbal intelligence, two screening tests, 128.
Visual factors, efficiency, textile inspectors, comparison, 812; —— stimuli, errors, perceiving, temporal order, auditory, 382.
Vitamin A content, diet, recovery, glare blindness, effect, changes, 359.
Vocational aims, Strong interest test, scores, high school senior girls, stated, 64; —— guidance, follow-up, 285; —— interest blank, Pressey senior classification test, selection, casualty insurance agents, use, Strong, 793; —— test, clerical workers, general clerical battery, United States employment service, comparison, Minnesota, 75; —— wishes, expectations, relationship, economic status, high school girls, 399.
Voices, salesmen relationship, sales ability, ratings, transcribed, 499.

War economy, workers' reactions, industrial problems, 416.
Wishes, children's, 231.
Work, effect, practice, screwdriver, 197.

X–O test, improved method, scoring Pressey, 841.

INDEX OF AUTHORS

The names of authors of original contributions are printed in capitals and small capitals.

ACHILLES, PAUL S., 151.
AMRINE, HAROLD T., 197.
Anderson Amos C., 716; 864.
AYERS, A. W., 812.
BALD, L., 382.
BARNES, RALPH, M., 197.
BARRE, MARGUERITE F., 785.
BECKHAM, ALBERT SIDNEY, 210, 777.
BENNETT, GEORGE K., 121.
BERRIEN, F. K., 55, 382.
BINGHAM, WALTER V., 17.
BLAKEMORE, ARLINE M., 850, 852.
BONNEY, M. E., 352.
BOUSFIELD, WESTON A., 487.
BOYNTON, PAUL L., 399.
BROWN, C. W., 359.
BRYAN, ALICE I., 371.
CARLTON, THEODORE, 159.
CHURCHILL, RUTH DIETZ, 669.
COOK, DAVID W., 785.
COOPER, W. E., 352.
CRISSEY, ORLO L., 64.
CRISSY, WILLIAM J. E., 94.
CRUIKSHANK, RUTH M., 121.
EDWARDS, ALLEN L., 187.
FAY, PAUL J., 499.
FISK, L. B., 359.
FLANAGAN, JOHN C., 94.
FRANZEN, RAYMOND, 477.
FRICK, H. L., 682.
FULCHER, JOHN S., 511.
GALLUP, GEORGE H., 10.
Gentry, J. R., 251, 253, 395, 718, 871.
GHISELLI, EDWIN E., 75, 332, 468, 793.
Gibbons, Charles C., 863, 872.
GIFFEN, LOWELL L., 841.
GOODMAN, CHARLES H., 721.
GUEST, L. P., 180, 800.
HALL, W. E., 530.
HANMAN, BERT, 809.
HARTSON, L. D., 594.
HATHAWAY, S. R., 614.
HAY, EDWARD N., 850, 852.
JACKSON, T. A., 308.
JEROME, E. A., 308.
JOHNSON, BEATRICE R., 543.
JOHNSON, HARRY W., 594.
Kirkpatrick, Forrest H., 249.
LAWSHE, C. H., 770, 846.
LEPLEY, WILLIAM M., 50.
LEUBA, CLARENCE, 439.
LEWINSKI, ROBERT J., 316.
LINK, HENRY C., 416, 862.
MCGEHEE, WILLIAM, 584.
MCKINLEY, J. C., 614.
MANSON, M. ELIZABETH, 594.
MELTZER, H., 268.
MERCER, MARGARET, 738.
MIDDLETON, WARREN C., 499.
MILES, WALTER R., 21.
MITRANO, ANTHONY J., 482.
MOFFIE, D. J., 584, 606.
MORGAN, MILDRED I., 168.
MUSSER, WAYNE, 575.
NEWBURGER, MAURICE, 81.
Oberlin, K. W., 397.

Ojemann, Ralph H., 168.
Older, H. J., 241.
Partington, J. Edwin, 563.
Paterson, Donald G., 38, 227.
Patrick, James R., 117, 868.
Patterson, T. L., 682.
Peters, Henry B., 692.
Politz, Alfred, 477.
Price, J. B., 382.
Robinson, F. P., 530.
Ruch, Floyd L., 448.
Rush, Harvey, 218.
Rusmore, J. T., 523.
Ryan, T. A., 543.
Scantlebury, R. E., 682.
Schoenfeld, N., 308.
Searle, Lloyd V., 702.
Selover, Robert B., 296, 456, 587.
Shuey, Audrey M., 659.
Shultz, Irvin T., 218.
Simon, George B., 653.
Skodak, Marie, 64.
Sperling, Abraham, 828.
Sprague, R. O., 382.
Starch, Daniel, 257.
Starcher, G. W., 113.
Teegarden, Lorene, 633, 754.
Thompson, Claude E., 24.
Thorndike, Edward Lee, 8.
Thorndike, Robert L., 128.
Tiffin, Joseph, 575.
Tinker, Miles A., 38, 227.
Toops, Herbert A., 136.
Torkelson, H. P., 359.
Travers, R. M. W., 625.
Tubbs, William R., 338.
Webster, Edward C., 285.
Wilke, Walter H., 371.
Woolwine, Ruth Dowell, 399.
Wulfeck, Wallace H., 41.
Young, Kimball, 448.
Zelios, Rose, 231.
Zubin, Joseph, 511.

Beginning January 1, 1943

The Journal of Applied Psychology

will be published by
the American Psychological Assn., Inc.

All subscriptions and all inquiries should be directed to Willard L. Valentine, Business Manager of the Publications of the American Psychological Association, Inc., Northwestern University, Evanston, Illinois.

The Present Editor

. . . desires to express his appreciation for the hearty co-operation of contributors and subscribers in the past, with the hope that such will continue to be even greater under the new management.

JAMES P. PORTER, Editor
Ohio University

JAN 1 1 1943

VOL. XXVI DECEMBER, 1942 No. 6

THE JOURNAL OF APPLIED PSYCHOLOGY

JAMES P. PORTER, *Editor*
OHIO UNIVERSITY ATHENS, OHIO

With a Board of Cooperating Editors
and
PAUL S. ACHILLES HENRY C. LINK
Associate Editors Representing
THE PSYCHOLOGICAL CORPORATION

SOME INTERESTING CONTRIBUTIONS IN THIS ISSUE:

DAVID W. COOK AND MARGUERITE P. BARRE. The Effect of Specialized Industrial Norms on the Use of the Minnesota Rate of Manipulation Test as a Selective Instrument in Employment Procedure

EDWIN E. GHISELLI. The Genesis of Brand Awareness

MARGARET MERCER. A Study of Interest Patterns of Successful and Unsuccessful Home Economics Students Entering College with Similar Achievement and Aptitude

C. H. LAWSHE, JR. The Purdue Industrial Training Classification Test

PUBLISHED BI-MONTHLY BY THE EDITOR
OHIO UNIVERSITY, ATHENS, OHIO
PRINTED BY THE SCIENCE PRESS PRINTING COMPANY, LANCASTER, PA.

Entered as second-class matter at the post office at Athens, Ohio, under the act of March 3, 1879. Additional entry May 7, 1936, at the post office at Lancaster, Pa.
Copyright 1942 by James P. Porter.

The Journal of Applied Psychology

EDITORIAL BOARD

W. V. BINGHAM, Personnel Research Federation, New York; M. E. BROWN, San Diego State Teachers College, San Diego, Calif.; [illegible], Ohio State University; [illegible], Northwestern University; [illegible] HEALY, Baker Foundation, Clinic, Boston; H. L. HOLLINGWORTH, Columbia University; A. [illegible], Delaware Division of Special Education, Wilmington, Del.; HARVEY S. HOLMES, Princeton University; HARRY [illegible] McCOMAS, Johns Hopkins University; WALTER [illegible] SCOTT, Northwestern University; C. E. SEASHORE, University of Iowa; DAVID [illegible] STARCH, New York University; R. R. SYMONDS, Jr., Leland Stanford University; L. M. TERMAN, Leland Stanford Jr. University; E. L. THORNDIKE, Columbia University; JOSEPH [illegible], New School of Social Research; [illegible] HELEN THOMPSON [illegible], Teachers College, Columbia University.

The [illegible] JOURNAL OF APPLIED PSYCHOLOGY will include the following: (a) [illegible] application of psychology to vocational activities, such as trade, art, publishing, advertising, industrial and transportation work, and problems of business [illegible]; (b) Studies of individual personalities, such as types of character, special abilities, genius, and individual differences, including the problems of mental [illegible] and vocational prognosis. (c) The influences of general environment, [illegible] such as climate, [illegible], humidity, temperature; also [illegible] conditions as illumination, [illegible]. (d) The psychology of everyday activities, such as reading, [illegible], [illegible], playing games or playing musical instruments, sports, etc.

[illegible] communications, manuscripts, [illegible] summaries, notices, books and other material for review should be addressed to [illegible] James P. Porter, Ohio University, Athens, Ohio. Contributors are requested to follow the observational method of citations employed by the JOURNAL; in every case the year, volume and pages should be specified.

THE JOURNAL OF APPLIED PSYCHOLOGY is published bi-monthly. The subscription price is $5.00 a year. Single numbers $1.25 to $2.00, depending upon the number of pages. Remittances and business communications should be addressed to the Editor, [illegible] P. Porter, Ohio University, Athens, Ohio.

Directory of American Psychological Periodicals

(Continued)

Journal of Comparative Psychology—Baltimore: The Williams & Wilkins Co. Subscription $7.00 per volume of 500 pages. Two volumes every year. Acting Managing Editor, Roy M. Dorcus. Founded 1921.

Comparative Psychology Monographs—Baltimore: Williams & Wilkins Co. Subscription $6.00. 400 pages per volume. Roy M. Dorcus, Managing Editor. Published without fixed dates, each number a single research. Founded 1922.

Genetic Psychology Monographs—Provincetown, Mass.: The Journal Press. Subscription $7.00 per volume. One volume per year. Edited by Carl Murchison and an international cooperating board. Quarterly. Each number one complete research. Child behavior, animal behavior and comparative psychology. Founded 1925.

Psychological Abstracts—Ohio State University, Columbus, Ohio: American Psychological Association. Subscription $7.00 a year ($7.50 foreign). 700 pages ann. Edited by W. S. Hunter. Monthly. Abstracts of psychological literature. Founded 1927.

Journal of Genetic Psychology—Provincetown, Mass.: The Journal Press. Subscription $14.00 per annum; $7.00 per volume. 1,000 pages annually (2 volumes). Edited by Carl Murchison and an international cooperating board. Quarterly. Child behavior, animal behavior, and comparative psychology. Founded 1895.

Journal of Social Psychology—Provincetown, Mass.: The Journal Press. Subscription $7.00. 500-600 pages annually. Edited by John Dewey, Carl Murchison, and an international cooperating board. Quarterly. Political, racial, and differential psychology. Founded 1929.

Personnel Journal—New York: The Personnel Research Federation. Subscription $5.00. 400 pages. Edited by Charles B. Slocombe. Published monthly, except July and August.

Mental Measurement Monographs—Baltimore: The Williams & Wilkins Company. Subscription $5.00. 400 pages annually. Edited by Knight Dunlap and Buford Johnson. Published without fixed dates, each number a single research. Founded 1926.

Studies in Psychology and Psychiatry—Baltimore: The Williams & Wilkins Company. Subscription $5.00. 400 pages annually. Edited by Edward A. Pace. Published without fixed dates, each number a single research. Founded 1926.

Journal of Educational Psychology—Baltimore, Md.: Warwick & York. Subscription $6.00. Edited by Jack W. Dunlap, Harold E. Jones, and Percival M. Symonds. Published monthly except June to August. Founded 1910.

Child Development—Baltimore, Md.: Williams & Wilkins Company. Subscription $5.00. 400 pages annually. Edited by Buford Johnson. Quarterly. Founded 1930.

Character and Personality—Durham, N. C.: Duke University Press. Subscription $2.00 per annum. Quarterly. Published simultaneously in Great Britain and the United States. Edited by Charles E. Spearman (London) and Karl Zener (Duke University). Founded 1932.

Journal of Psychology—Provincetown, Mass.: The Journal Press. Subscription $14.00 per annum; $3.00 per volume. 1000–1200 pages annually. Immediate publication for any accepted manuscript. Edited by Carl Murchison and an editorial board. Quarterly. The general field of psychology. Founded 1935.